# The Builder.

*SATURDAY, OCTOBER* 16, 1852.

AT the present moment the proper size of drains is being discussed as vigorously and as widely as if nothing were known about it: the experiments and evidence on record are ignored, and there seems a disposition to fall back into the old ways even amongst the Metropolitan Sewers Commissioners. It is to be hoped they will first reflect on what they are about to do. We have received, as we said last week, a number of communications on the subject, but can find room only for one at this moment, which steers midway between two conflicting opinions, and will stand for something of what we are about to write.*

"With reference to the shower of letters on the subject of pipe-drainage," says the writer, himself an engineer, "pray let it be remembered that partial failure is incidental to all the works of man. Have there not been failures in brick sewers, in stone culverts, in bridges, in viaducts, in churches, and in houses? Do not steam-engines blow up, and carriages break down? In fact, is there not partial failure even in the operations of nature? if such a complexion may be put upon breakings, burstings, and crumblings.

That *small pipes* have failed, in many instances, is a fact too notorious to be denied. Have not the small pipe drains which were laid down at Whitehall by the Commissioners of Sewers, right in the way, and in the sight of the General Board of Health, failed? Yea, more than once to my certain knowledge; and I have been told of numerous failures in other places, within the jurisdiction of the Commissioners in Greek-street; and I think it is highly probable we shall hear of other failures from the same quarter. Before, however *small pipes* are denounced, these failures should be investigated; and the extent of success should be weighed against the extent of failure. There have been some thousand miles of small pipe sewers laid within the last seven years (upwards of 200 miles in the metropolis), under all sorts of conditions, and there has been bad material, with worse workmanship. Miles of pipes have been used without fall, and refuse of all sorts is crammed into them without care. There are, therefore, partial failures. Small pipes have been crushed, so have brick sewers; small pipes have been choked, so have large sewers. Small pipes have been laid too small, brick sewers have been laid too large. Let us have a fair balance struck."

Some of the statements which have been made by the opponents of the new system are mendacious in the extreme; thus, for example, Cardiff has been placarded, since the determination to adopt pipe-drainage there, summoning the rate-payers to a public meeting, "to consider what steps shall be taken to prevent the carrying out the ruinously expensive system of pipe-drainage, which has been *proved, beyond doubt, to be a failure* wherever the experiment has been tried."

Now, the fact is, no such proof whatever has yet been given in any one place. We do not abandon a useful apparatus because it is put out of order once or twice by improper treatment or through want of knowledge, but first strive to remove the impediments to its successful working. If people will throw bricks, brooms, and babies into a 4-inch pipe, of course the drainage will be stopped; but surely this is not sufficient reason, supposing the great advantages of small drains in other respects, and their complete efficiency when properly used satisfactorily proved, for abandoning the pipe drain which would take away the refuse at once and while innocent, and substituting a monstrous brick receptacle, wherein it may decomposing lie, develope its incipient evil, and distil off its murderous gases.

We have yet to learn the actual facts of what is called the failure in Church-lane, St. Giles's, and which may be so for anything we know to the contrary. That the work was badly done, that some of the houses are occupied by large numbers of trampers and others wholly ignorant of proprieties, and that the drains of many of the houses have been stopped, we have every reason to believe, but if on no other grounds than these the Sewers' Commissioners abandon the pipe drain and go back to the brick receptacle,—prefer "stagnation" to "circulation," as it was forcibly expressed at the Belgic Congress the other day, they will incur a reproach which will grow heavier with the increase of knowledge on the subject.

We are not by any means pledged to th approval of pipes of the minimum size prescribed by theory, knowing the casualties to which ignorance subjects them, and the inconvenience that failure causes. Our hesitation, however, lasts no longer than would admit of the confirmation of theory by practice, and the devising of such means as might prevent the recurrence of stoppages by misuse. It has happened to us, in private practice, to lay down several miles of pipe-sewers and drains, of smaller size, under the orders of the then Commissioners, than seemed to us at the time, and in the place, expedient. But our fears, not that the drains were insufficient for their legitimate purpose, but that they would fail under accidents to which they were liable, have proved needless. Up to this time we are not aware of any inefficiency. The cost under the old system, and this is an important point to bear in mind, would probably have delayed the drainage of the neighbourhoods to which we are alluding several years.

The evidence on record, unless the most extraordinary fabrication ever known, is so conclusive against the old system of sewerage that it seems childish again to discuss it. And there are experiments as to the run of water through pipes, which cannot be talked away. The new "Minutes of Information collected with Reference to Works for Drainage," to which we have previously alluded, contain some important tables prepared by Mr. Roe, which show how erroneous were the formulæ hitherto used—erroneous through not being founded on the right conditions. The first table shows the quantity of covered surface from which circular sewers (with junctions properly connected) will convey away the water coming from a fall of rain of 1 inch in the hour with house drainage, as ascertained in the Holborn and Finsbury divisions. It is so curious in its results that we give it in full:—

DIAMETER OF PIPES AND SEWERS IN INCHES.

| | 24 | 30 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | acres. | acres. | acres. | acres. | acres. | acres. | acres. | acres. | acres. | acres. | acres. | acres. |
| Level | 38½ | 67½ | 120 | 277 | 570 | 1020 | 1725 | 2850 | 4125 | 5 825 | 7,800 | 10,100 |
| ¼ inch in 10 feet, or 1 in 480 | 43 | 43 | 135 | 308 | 630 | 1117 | 1925 | 3025 | 4425 | 6,250 | 8,300 | 10,750 |
| ⅓ inch in 10 feet, or 1 in 240 | 50 | 50 | 155 | 355 | 735 | 1318 | 2225 | 3500 | 5100 | 7,175 | 9,550 | 12,400 |
| ½ inch in 10 feet, or 1 in 160 | 63 | 113 | 203 | 460 | 950 | 1692 | 2875 | 4500 | 6575 | 9,250 | 12,300 | 15,950 |
| 1 inch in 10 feet, or 1 in 120 | 78 | 143 | 257 | 590 | 1200 | 2180 | 3700 | 5825 | 7850 | 11,050 | 14,700 | 19,085 |
| 1½ inch in 10 feet, or 1 in 80 | 90 | 165 | 295 | 670 | 1385 | 2486 | 4225 | 6625 | | | | |
| 2 inches in 10 feet, or 1 in 60 | 115 | 182 | 318 | 730 | 1500 | 2675 | 4550 | 7125 | | | | |

The second shows the "size and inclination of main house drains for given surfaces, and the number of houses of either rate thereon." In this it is shown, according to Mr. Roe, that nine fourth-rate houses may be drained by a 3-inch pipe, if with a fall of 1 in 20; and ten first-rate houses by a 5-inch pipe, with the same fall! We do not suppose the Board intend to recommend the *adoption* of these sizes in such cases; at all events we do not.

From these tables the Board deduce "that the sewer formerly proposed as the smallest size admissible for the drainage of a "mansion," viz. 15 inches, would, at a fall of 1 in 120, drain 179 of the largest mansions, or 284 of the smallest houses; that a 9-inch drain (the minimum size prescribed by the Building Act, for the drainage of a single house), would, at the same gradient, remove the storm-water from twenty-one of the largest mansions, or from seventy-six of the smallest houses; or, at a fall of 1 in 60, would drain nearly 100 of the smallest, or an area of nearly 2¾ acres of covered surface. An 18-inch sewer, less than that prescribed as the minimum size into which a man might crawl for cleansing, would, at an inclination of 1 in 80, remove the storm-water from nearly twenty acres; and a sewer of 3 feet (less than the minimum size formerly recommended for the smallest street) would, at the same inclination, remove the drainage from 295 acres.

The report points out, as a "hydraulic paradox" (the knowledge of which is very important, by the way), the fact that a uniform, sufficiently sloping, open channel, which at its top is freely receiving from a reservoir, or a meeting of currents, so much water as completely to fill its mouth, can yet receive into its stream lower down, large additional quantities of water through lateral inlets, and will then discharge from its bottom opening, which is of the same size as the top opening, even several times as much water as entered at the top. Another of these "paradoxes" is the fact, that if a common funnel, or a short piece of tube with a gaping mouth, be held under a water-cock, and as much water be allowed to fall into it as to maintain it nearly full, and if then a pipe of the same diameter as the lower

* One of the objectors, a medical man, says,—"In my professional duties, among other matters, nothing has appeared to me more important than the perfect drainage of every dwelling-house, particularly in large and crowded towns. The mode of drainage seems yet open to much practical improvement. Pipe drainage in itself is, perhaps, one of the best of recent date; but I consider it has two evils, as now practised: the first, but least, because easily remedied, is the difficulty of opening any part of the course of piping without breaking up and disturbing a considerable portion; this, however, is got over by the use of the half-flanged pipe. The second evil (the Alpha and Omega of this letter) is of the greatest magnitude, viz. the pipes being too small. They tell us, that while a pipe of one inch in diameter is quite adequate to supply a moderate-sized house with water, one four inches in diameter will amply suffice to drain it; but such is not the *fact*, as the very discussion at the Sewers' Board plainly shows. They compel builders and persons draining their houses to adhere to certain rules laid down, and furnish them with a pipe-heading of a size by which numbers of people are able to prove their houses will not drain properly. In vain is it for the Sanitary Commissioners, to urge the use of drainage, while other commissioners compel the public to adopt so impotent and dangerous a method. I am aware that many persons contend and believe that small pipes are as useful and efficient as the larger ones; but such is found not to be so in practice. They talk of the force of the current being greater in the smaller pipes, &c.; but as the refuse of all kinds thrown down the drains is only held in suspension, and as each portion is poured down separately, it lingers along in a very small and feeble stream, getting weaker and weaker, till it dribbles away into the main sewer, and thus much of the refuse is deposited along the sides of the drain, which, of course, becomes quickly obstructed if but of small size."

outlet of the funnel, or a piece of tube be joined to it so as to lengthen it below, the quantity of water passing through, instead of being lessened by the friction of the additional downward pipe, as happens when an addition is made of horizontal pipe, will be increased in a proportion to the length of pipe added, until that length reach a level of about 34 feet below that of the mouth of the apparatus.

The Minutes of Information contain, it is to be regretted, a repetition of the taunts on "professors of architecture" to which we have before objected in documents from the same quarter, and which have served to array unnecessarily a large amount of feeling against the discovery and progress of truth.

From Croydon statements of failure have been made to us which certainly are not borne out by inquiries on the spot. Out of 1,500 or 1,600 houses, 1,312 are connected with the sewers, and great improvement is observable in various parts of the town. Portions of the work might have been done better; there are occasional stoppages in a few house-drains, of course, and some of the pipes at Broad Green, we are told, have given way; still, as a system, including the supply of water and the useful application of the solid part of the sewage to a certain extent, it appears to be working very satisfactorily. The pipe-drains range from 4 inches to 18 inches, and it is an instructive fact to notice that substances (paper for example) are delivered at the out-fall in a perfect state, whereas, according to the testimony of some who have been long connected with drainage-works, such matters never reach the out-fall of the old sewers, being detained either in the brick house-drains or the sewers themselves until they are disintegrated!

## THE POSITION OF ORGANS AND CHOIRS IN CHURCHES.*

The position of an organ will generally depend on that chosen for the choir, and sometimes (but in a smaller degree) the position of a choir must depend on the position of the organ. Occasionally, the position of the choir must depend on that chosen for the minister.

The chief question on which the position of choirs and organs will depend in parish churches is this:—Is the service of our church a Congregational Service, and the prayer *Common* Prayer? Is the choir to be considered as part of the congregation? are we—as I have before ventured to ask in another paper—to lay it down as a fundamental rule in parochial worship, that choirs are not organized to sing to or for us, but *with* us; and should not their position in churches be such as would best conduce to bring about this, the main object of their services? In churches where the congregation is not entirely in the choir, as in cathedrals, but in the nave, as in most parish churches, is the chancel the proper place for a choir? Again, can it be clearly shown, that the organ is so insignificant a part of the *fittings* of a church, or of so little consequence in the due and efficient celebration of Divine service—especially when that service is choral service—that it should be concealed from view as much as possible, and its tones smothered and its whole action and mechanism perilled by being placed (as I understand it is in the beautiful church at Howden) under a low arch, near a dead, damp wall, and surrounded with pillars? By concealing this noble ecclesiastical instrument as much as possible, it has been said, that two very important advantages are gained;—first, an uninterrupted view of the architectural beauties and proportions of the building in which it is placed; and, second, that the tones of the organ affect the congregation more when their source is, as it were, unknown.

The first is, indeed, a most important point, and should always be kept in view both by architects and organ builders; but, if the organ, from its unquestionable superiority over all other instruments, is the instrument most suitable to the majesty of Divine worship, can it with any propriety or reason be placed in such a situation as neither to be fairly seen nor heard? And yet it is a fact that the majority of church architects waive this important consideration in preparing their plans for any new structure; so that if the erection of an organ be not specially named, and is not brought forward till some time after the completion of the church—which is often the case from want of funds and other causes—the architect is astonished and confounded some fine morning at being told that an organ is to stand in a situation which he feels will assuredly ruin the proportions of his building.

Surely, the architect of St. John's, Holbeck, cannot really believe, if he has considered the matter at all, that the hole in the wall over the north porch is a suitable place for an organ? And yet I am told, on credible authority, that it is intended to place an organ there, and such a one as will be worthy of the church, and of the liberality of its pious founders—the choir, it must be remembered, being at the other end of the church.

No person, who is at all acquainted either with music or the principles of acoustics, can imagine that an organ placed under a low arch, with three sides of it close to dead walls—in fact, in a stone box—will produce the same effect as an organ placed in an open situation in the church where the vibration is considerable. "Organ builders," says an intelligent writer on this subject, "well know the difference between voicing an organ for a recess in a small chapel, and one for a central situation in a spacious church. In one case where the obstacles are numerous and close to the organ, it is almost impossible to produce a proper quality of tone, especially from large pipes. Whereas, in the other case, the organ builder soon finds the required tone, owing to all obstacles being at a distance, and the vibration of each pipe not being disturbed but in its 'periphery,' thus causing an agreeable reflection of sound, such as we find on listening to the organs in our cathedrals and other large buildings." It is a singular fact connected with the amount of resonance in different buildings, that the enormous organ built by Mr. Willis, which stood at the west end of the Crystal Palace, and which contained three sets of manuals, an immense number of stops, and a large pedal organ, was not in effect so powerful as an instrument in a church at Islington, with one row of keys and eight stops. This anomalous effect must be attributed solely to the total absence of reverberation from the immense quantity of *glass* in the Great Exhibition.

From what I have stated at the commencement of my paper, it will be seen, I think, that no one position for organs has exclusively been adopted in any age of the church,—though it must be admitted that from about the fifteenth century they have been generally placed, in parish churches, in the western gallery, — and in cathedrals and collegiate churches on the screen which separates the choir from the nave.

The present generation being at liberty, then, to legislate on the subject, I have ventured, as a church organist, to draw up a few rules, which, I hope, may be of some service to those who wish to place organs and choirs in churches in such a position as will best suit the requirements of the choral service—and, at the same time, not disfigure the architectural beauties of the building.

Rule 1. An organ should not play over one choir to another choir.

Rule 2. The people should not be between the choir and organ.

Rule 3. The singers in a choir must not have their backs to the people.

Rule 4. A choir should *never* be in a gallery.

In churches where there is a double choir and an organ, it seems to me that the organ may often be advantageously placed in the centre of a low organ screen, in the old and common position. As a general rule, choirs should as nearly as possible form an equilateral triangle with the organ. It is an important question, and one deserving of close investigation, whether listeners, or those who depend on choirs for assistance, should be east of the choirs; and it is certainly not advisable for the congregation to come between the choir and organ. I cannot help remarking here, that the usual places appropriated to the dignitaries in our cathedrals appear to be the worst in the church, and it is very curious that the chief places should be west of the choir.

I stated in rule 1, an organ must not play over one choir to another choir, as at the Temple Church, and at St. Andrew's, Wells-street. It has a one-sided effect; and, as the organist generally hears one choir above the other, and the choir nearest the organ hears considerably more of the organ than the other choir opposite, it is frequently the cause of serious faults and blemishes in the performance of the music. For this reason the organ should always, if possible, be placed considerably above the heads of the singers,—the tones of an instrument proceeding immediately before a choir will, assuredly, rather confuse than assist them. If, therefore, circumstances require the organ to be placed on the floor of a church, the sound-board should be fixed as *high* as the architecture, or other points, will allow.

It is well known, I believe, that a war has been for some time carried on by architects against cathedral organs, and many of them are being removed from their legitimate place and poked into transepts, galleries, and elsewhere, to the injury of the instruments, and the hindrance of the choral service. A gentleman who takes great interest in ecclesiastical architecture and ecclesiastical music (Sir Henry Dryden, of Canons Ashby), writes me, that the reason of this war "is the noisy tastes of organists, who have got their instruments to such a huge size as to be disfigurements to the building, and at last intolerable, and consequently removed." "Organs of a sufficient size," he continues, "lowered a little more into the organ screen, would be no disfigurements."

In Westminster Abbey, the choir organ remains in its original place, and the result of placing the great organ and swell on either side, is said by some persons to be the most successful example of removal in England.

I understand that the organ in Canterbury Cathedral is made very heavy in the touch (by the distance between the pipes and the keys), and slow in speech (by removal), and is, moreover, lopsided in effect. The Temple organ is muffled in a box, and unequal in its effect: to a great extent the same may be said of the organ at our Leeds Parish Church; and these defects all result from the improper placing of these instruments.

With regard to parish churches, which have commonly chancels—not choirs, as in cathedrals,—and as the chief part of the church is filled with the congregation, I may ask, ought not the service to be *congregational?* It is evident, if the people are to sing, they must in a great measure be dependant on the choir. They, must, therefore, hear the latter as distinctly as possible, and must not, consequently, be between it and the organ.

To those who have thought at all upon the subject of my paper, I need scarcely say that the arrangement of the organ and choir must be greatly regulated by the size and shape of the church; so that no rule can be laid down for the exact position of either. Although it is not to be expected that choral service will be attained in every church, yet it is always desirable to arrange the singers so as to form two choirs; and I may venture to lay it down as an axiom, that service, however musical, is no choral service if there are not *two* choirs. Speaking historically, it seems hardly right to adduce as evidence for the proper position of choirs, any customs which may have prevailed before the Reformation, as the service then was not a congregational service. But since

* From a paper by Mr. William Spark, Organist, Leeds, read before the Yorkshire Architectural Society, May, 1852. The complete paper, with illustrations, is published by Novello, Dean-street.

the Reformation, I believe, there has been scarcely a choral service in a church with only a chancel instead of a choir. Presuming, then, that our service is a congregational service (which is its distinction from all other services), it is quite wrong for the minister to be screened off from the people; he ought, I presume, to be always in the nave (as, indeed, he generally is), except for the Communion Service; and we will suppose the officiating minister to face north or south, except during the reading of the Lessons, when he faces west. Now the people are all the time facing east. This being the case, it seems absurd for a minister placed in the nave to be responded to by a choir in the chancel,—perhaps on the other side of a screen, whilst the people are in the nave.

At Canons Ashby (Northamptonshire), the people face *east*. The two choirs are behind them, and the organ still west, behind the choirs. This plan is good for the singing of the choir, and the people's hearing and singing; but it is objected to on the ground that the congregation might *turn round*, as they but too often do, when the choir is in a west gallery. The organs in Jesus College, and St. John's, Cambridge, are placed, I am informed, in small galleries (appropriated to the organ alone) on the north side of the chancels, about eight feet from the floor; the front of each instrument containing the diapasons projects from an arch: the organ in St. John's is an example of the position of an organ about the period of the Reformation, but now unused, the musical service in this, as well as in several other College chapels in Cambridge, having been for a number of years discontinued; that in Jesus College is after the ancient mode, and is found to be effective.

One plan which I would suggest, is to have the two choirs facing one another, near the desk and pulpit (the people facing east), and to have the organ on *both* sides of the chancel (the conducting tubes and trackers going under the floor), or at the east end of *one* aisle.

We will now suppose the singers to be in the chancel, and assume that the two choirs are on the two sides of the chancel, as at St. Margaret's, Leicester; then the organ (if the chancel is large enough) may be east of the choir, and divided.

This particular organ at St. Margaret's, Leicester, is, however, clumsily managed, and looks ugly and untidy; but there is, of course, no necessity for that. Besides being divided, a part of the organ on the north side is placed in an additional building, which also serves for the vestry. This plan answers exceedingly well, and if the choir *is* to be in the chancel, and the chancel is large enough, it is, perhaps, the best plan. If the organ is small, it may be altogether inside the arch opening into the vestry, so as to make, by its front, an ornamental filling up of the arch. In that case, it would be better to have the player at the *east* side of the organ, and the blower opposite to him.

At Byfield, Northamptonshire, the organ, as in cases named just now, is over the altar, which is, of course, indefensible; but the *musical* effect might be good if the choir was in the chancel. At Cannons, in Hertfordshire, Handel's organ is, or was, in a similar position.

At St. Mark's, Chelsea, there is at present no organ; the choirs face each other in the transepts, and the people face *east* in the nave. This, it appears to me, is just as it should be. It has been proposed, in case an organ is placed in the church, to put it round the apse, between the colonnade and the exterior wall. I have no doubt it would answer very well in that position. If a chancel has aisles, the east end of one aisle might, I think, often be a very good place for the organ, or against the wall of the aisle, especially if elevated.

An organ builder of great experience, gives it as the result of his observation, that the most favourable position for sound seems to be where the organ can be placed under a roof which has a pitch or inclination of 45 degrees. A *low* roof, especially when plastered, is generally prejudicial to sound; and a number of angles in a low roof is also most unfavourable to sound. He considers that wood and stone are each as favourable reflectors of sound as chalk and plaster are unfavourable.

In places where neither the principles of architectural societies have penetrated, nor the desire to return to the former customs and uses of our church, either in the celebration of the service or in the fittings of the edifice, has been felt, the place of the choir, as many of us know to our sorrow, is still in the west gallery; and this arrangement is not only objectionable in a *musical* point of view, but, so far as *my* experience goes, it certainly prevents the carrying out of that excellent passage in Holy Writ, "Let all things be done decently and in order."

The most successful example I can adduce of the position of an organ near the choir, and not in a gallery, is in the new church of St. Mary Magdalene, St. Pancras, London, where the organ is placed against the wall, at the east end of the south aisle, on stone corbels about 8 feet high—thus elevating the instrument considerably above the singers, so that both sides of the choirs and congregation hear the organ equally well.

## CHRISTIAN ART.—CONCEPTION OF THE VIRGIN.

If I may claim space for a few lines in reply to Mr. Hendrie's second letter on the above subject, I would beg to state that it is because I so highly appreciate the value of iconology as a record of "the various phases of theological history," and so fully entertain the view that "Christian art is nothing less than theology figured;"—it is on this very account that, as an admirer of Christian art, I have ventured to record my protest against any unadvised or hasty change of titles which have been long identified with particular pictures, or rather types of picture.

An artist produces a painting, and calls it "Our Lady of the Immaculate Conception:" posterity, for brevity's sake, call it simply "The Conception," and this goes on for two centuries till some one suddenly discovers that "Conception is a misnomer," and that "Assumption" is the proper term. Now this may be true or it may be not; but is it not manifest that if one generation may change a title, another may take the same liberty? And if one critic is in favour of "Assun ption," some future critic may advocate the title of "Beatification" or of "Glorification," for all these are equally applicable to the "Mulier sole amicta," seeing there is no Scriptural authority for any of them. And then where is this to end? And what becomes of the value of iconology as a history of "theological phases?"

No wonder, then, that a proposal of this kind should be received with some hesitation, although emanating from a mind the most profound and deeply versed in the subject-matter to which it belongs. The title of a picture may be the clue to its meaning, and an interpreter of the works of ecclesiastical painters is perhaps the last that can afford to abandon that clue.

Now, whether or not Murillo was himself carried away by the religious enthusiasm of the time,* there can be no doubt that in his vocation as an artist he would regard himself as the exponent of the favourite doctrine of his church and nation, and would accordingly deem it part of his mission, as well as the indispensable condition of success, to portray his Madonnas as free from the "peccatum originale," in the same sense as our blessed Lord himself. The importance of this sentiment in the composition of the picture no one can underrate. The human element is entirely eliminated. There remains the *form* only of woman, the whole *being* is divine. And it is manifest that a painter interpreting this doctrine would approach his subject in a very different spirit from one who might or might not regard the Virgin only as "Blessed among women," and this too, whether a glorified or expectant state were chosen as the medium of representation.

No one denies that Murillo studied, and in the main adopted, the forms and treatment offered to his contemplation in pictures of the "Assumption" by earlier schools, but he might for all this have aimed at infusing into his pictures a new and more perfect spirit of divinity, corresponding to the doctrine in his time so warmly professed; and to mark this change it is more than probable that he would seek for an appropriate title, and what so appropriate as "Our Lady of the Immaculate Conception?" To this title then, I, for one, intend to cling, both out of deference to the painter, and from an apprehension that if pictures of this type are to be merged under the title of the "Assumption," a valuable landmark in the history of art, and of theology, would be sacrificed.

On one point, of minor importance, I must apologise for not having made myself understood. When I asserted that the term "Conception of the Virgin" was a contraction of the full title "Our Lady of the Immaculate Conception," I did not mean that the two terms were logically convertible, but that in popular language the one was frequently substituted for the other in reference to one and the same picture. The very heading of Mr. Hendrie's first letter is a proof of this: he has there stereotyped the term "Conception of the Virgin," as a popular designation of the "Soult Murillo," whilst works of the highest authority prove that the full title is "Our "Lady of the Immaculate Conception." If then, this be not a contraction, call it a transposition, if you will, for that makes no difference. It is a patent fact, that in hundreds of cases these two terms are applied indiscriminately to the same pictures; and it is only cutting the knot, and not solving the difficulty, to tell us, as your other correspondent does, that "if there is any meaning in words, St. Anne, and not the Virgin, *must* be the person who figures chiefly in a representation of the Conception of the Virgin," or to tell us that Pacheco made an egregious mistake, or wrote under terror of possible torture. Perhaps, however, the solution may be this,—a "Conception of the Virgin" may either represent a *fact* or a *doctrine*. If it be designed to represent the *fact*, then St. Anne must be the principal figure, with details according to the Athos MS. or the "St. Anna of the Gilded Gate." But if it be designed to represent the *doctrine*, then the Virgin will be the principal figure, with treatment according to the rules laid down by Pacheco.

There is in the Gallery of Bologna a picture (No. 57) with the following descriptive title—"S. Anne adorant la Conception dans la Glorie céleste." It is evident that such a picture could not represent a fact, but a doctrine; and that doctrine it was which Murillo sought to herald in his pictures of the Madonna, and therefore to call them "Assumptions" would be materially to divest them of their theological meaning.

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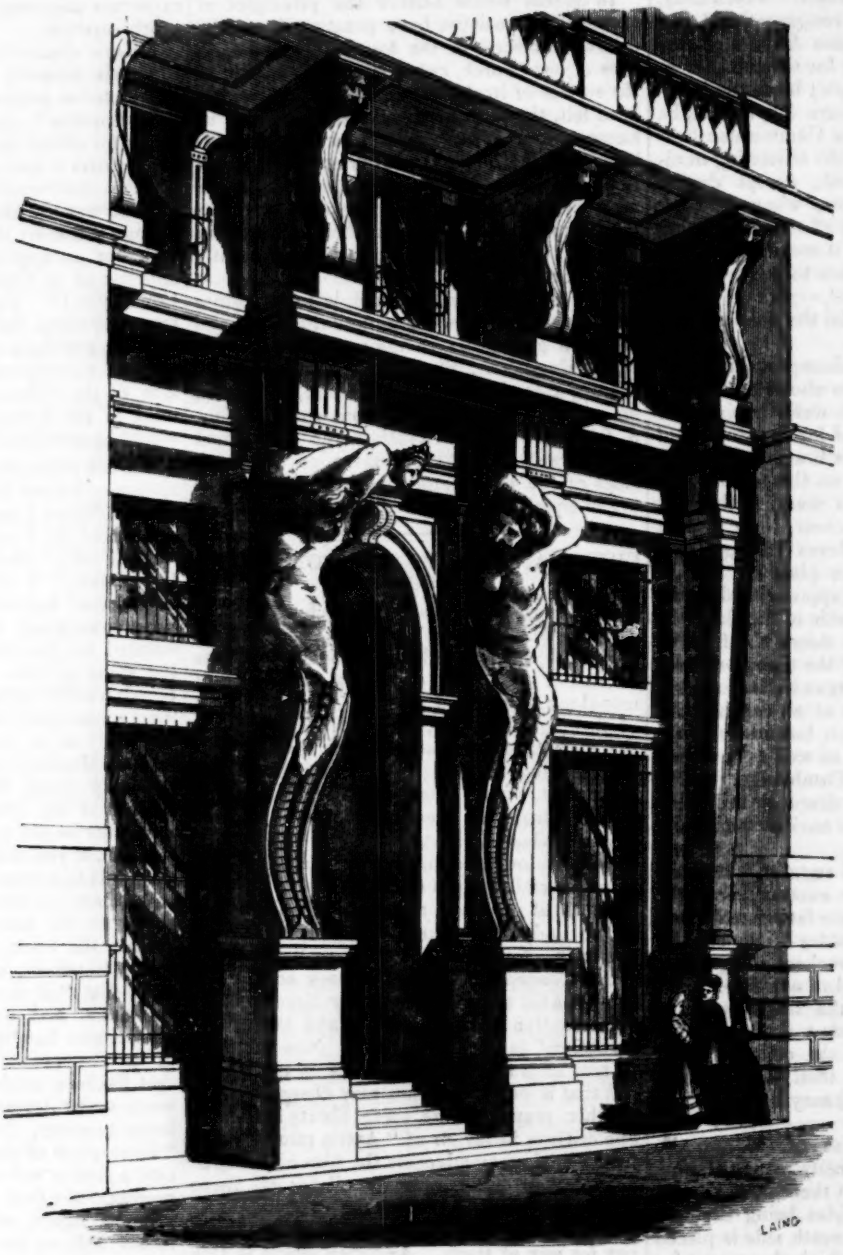
* I was well aware that the Immaculate Conception of the Virgin had been promulgated as a discretionary doctrine long before the 17th century; but it was the movement in Spain during that century, and the edicts which that movement extorted from several successive Popes, from the bull "Regis pacifici," of Paul V. in 1616, to that of Alexander VII. "Solicitudo omnium Ecclesiarum," in 1661, that first enabled the clergy to promulgate it in dogmatic form.

## Brick and Tile-making upon Copyhold Lands.

—The question which arose at the Halmote Court, held at Bishopwearmouth, in October last, for the Lord Bishop of Durham's Manor of Houghton-le-Spring, as to the right of the copyhold tenants of this manor to dig clay and make bricks, &c. upon their copyhold lands, has been settled against the tenants having any such rights by the Copyhold Enfranchisement Bill, which is now the law of the land. It stands in substance thus:—After the 1st day of July next, the lords of manors can compel their tenants to enfranchise their surface rights, fines, heriots, &c. in their copyholds, and the tenants have the same power against the lords. All the minerals, including coal, stone, clay, gravel, &c. which are all distinctly specified in the Bill, are reserved as belonging exclusively to the lords, and cannot be worked without their license or authority.—*Durham Advertiser.*

DOORWAY, GENOA.



## DOORWAY, GENOA.

This is the doorway to a palace at the end of the Strada Nuova, and exhibits considerable ingenuity of design. The material is white marble from Carara, and it is a fair specimen of the luxury and taste of the merchant princes who gave to Genoa her well-deserved title of *La Superba*.

G. T. R.

## SOMETHING OF AGRICULTURE AND CLIMATE.

Your advocacy of the rising science of agriculture must have afforded great gratification to many of your more reflective readers. The subject is a most interesting one; and many of your more strictly professional subscribers must see its important bearings on their own future prosperity as professions: of course, I allude to its engineering and its architectural features. There is a vast field opening on them in this direction. Building and engineering operations will yet be as vastly increased in agriculture and horticulture as they have been in other branches of manufacture since "the era of the distaff and the spinning-wheel."

Were I about to enter further on this subject in its engineering and its architectural aspects, I would be walking out of the province of mere "cursory comment and suggestion" on minor details altogether, and preparing an article which ought to be worthy of a separate place in your columns; but such is not my purpose in these preliminary remarks, which I design only as a palliative and a reason for offering in the columns of The Builder a few stray suggestions and comments which might otherwise have been erroneously imagined to be fitter for the columns of the *Gardener's Chronicle*,—so true is your occasional reminder that the interest and the office of The Builder spreads and extends in every direction, and grapples with and comprehends every great question almost that affects human progress. True, what I am going to note down here *would* probably suit the columns of the *Gardener's Chronicle*; nevertheless, it is not unadapted to those of The Builder itself in this more enlightened view of its important functions. If the advancement of agriculture be promotive of the architectural and engineering professions, anything that may tend to promote agriculture itself cannot but be of at least secondary service to these professions, and be quite in place in its present subordinate position. And besides, even apart from its not very distant or secondary bearing on the prospects of the builder, the architect, and the engineer, I think I shall have your permission in my endeavour to aid in rendering an occasional article such as the present as miscellaneous as possible in its nature, and, in fact, a sort of *olla podrida* of useful or amusing fragments in the shape of suggestion and comment, without any special restriction to "the shop." I am the more emboldened in this assurance when I call to recollection the sound and liberal sentiments expressed in a leading article on a recent occasion addressed more particularly to your younger professional readers on the folly of restricting their pursuits and studies to office acquisitions and duties merely, and on the advantage and indeed the necessity of enlightening their minds from every point of view—in every branch of knowledge.

"Not only," you remark, "is it 'desirable' you should get knowledge of this sort, but it is absolutely necessary. A general knowledge of the leading sciences is now so universally possessed, that ignorance of them in any one is a positive disgrace: to the title of architect, especially, you could, without this knowledge, have no claim. Irrespective of its importance to you professionally, it will give you fresh eyes: without it you cannot see what you look at: with it you may see, literally, through a millstone: all Nature's processes are opened,—every substance speaks. * * * And here let us caution you against the common error of supposing that it is *practical* science alone which concerns and benefits industry: practical science is but the application of abstract truths. * * * It is the men who are looking for and eliciting great truths, careless as to whether they will have any *immediate* effect in increasing the resources, enjoyments, and comforts of men, that are providing arms for the coming generation to achieve their triumphs in the industrial struggle of nations."

How entirely these sentiments harmonise with the quotation which I have since given in your columns from the philosophy of Dugald

Stewart, as a reason and an excuse for the suggestion of an occasional article such as the present note will help to form, it is not for me to point out to you. I will, therefore, without further general comment or apology, proceed with the subject of my present note on the progress of agriculture.

In a notice which you took, on 7th September, 1850, of a pamphlet, by Lord Willoughby de Eresby, on his ploughing machine, it is expressed as your belief—

"That an era of agricultural development, as vast and wonderful as that which the present age has already witnessed in manufactures, is not only within the bounds of possibility, but on the eve of advent,—that a time is at hand when our present primitive agricultural implements will be put away as curiosities beside the distaff and the spinning-wheel,—and that the alleged discovery by Daguerre of a mode of rearing three-year plants in three months,—the reported power of some of our market-gardeners to rear a salad (like a mushroom) in a single night,—the alleged power of the Japanese to dwarf the lofty pine into a miniature tree, a few inches only in height,—the traditional story of the monks of Glastonbury Abbey, who could make the hawthorn bloom at Christmas,—or even the trick of the Indian jugglers, who appear to cause a mango seed to spring up out of the soil in course of a few hours, and before the eyes of hundreds, unfolding leaves and flowers and fruit,—are all but, at the worst, vaticinary imaginings, or rudimental typifying *ideas, of actual powers of nature, scarcely less wonderful, and yet to be developed*; just as was the old traditional idea of the magnetic telegraph of separated friends, with its needles and alphabets, but without any record of *its invisible connecting wire*,—alone wanting to reduce it all to credibility. Believing, at all events, as we decidedly do, that a great era of agricultural development is at hand, when even the steam-plough, as it at present exists, may be a rude implement; it is interesting, in such belief, to witness just such beginnings of *this* anticipated era, as were the first steam-engines, or the first spinning and weaving machines, in manufacture—or the locomotive with legs, like a horse, in the railway system."

As if to countenance and corroborate the verisimilitude of these speculative ideas, the *Brussels Herald*, in course of the autumn of the year following on their insertion, that is, of last autumn, reported a strange exhibition of experiments witnessed by Abbé Moigno, whose guarantee, as a "conscientious writer," the *Herald* evidences. In these experiments, which are minutely detailed, it is declared that, by means of a reddish liquid, florists' plants of many different kinds were made to develope and open their buds into full flower, in the presence of a number of spectators invited for the purpose by M. Hebert, the horticulturist or experimenter. I allude to this, however, merely by the way: the report may be a hoax altogether, for all that I know; and, if so, may doubtless be based on or suggested by your own remarks just quoted: it is at least curious, however, and worth noting in this connection; but what I meant to follow up the quotation just given with was not this singular report, but one of a much more authentic description, and in reference to certain little experiments of my own.

Plants are subject to what is called a "sport," and it has been found that if that sport be followed up, it may be not only established as a distinct variety, but be made to yield further sports (or *developements*, rather, as it would really appear), to which it is found to be peculiarly liable. Acting on these facts, a M. Fabre, according to the *Gardeners' Chronicle* itself—to which I must now appeal—has actually succeeded in developing perfect and excellent wheat from one of the common grasses, liable to a sport of which he took advantage by carefully sowing its seeds, and rearing, and again sowing the most remarkable and most developed of the plants so yielded; and thus in twelve successive seasons, developing substantial wheat.

Now, could agriculturists or horticulturists only discover the means of causing or compelling cereals or other useful plants of any description to "sport" at will, immense and rapid improvements might be speedily looked for in the crops already realised; and one of my chief objects in preparing this note was to suggest means whereby this very desirable power may probably be at once obtained.

Being aware that varieties of flowers are often fixed "sports," and having heard from a gardener in the secret that charcoal has a decided power of invigorating the colour of red flowers, the idea struck me that perhaps charcoal might change the colours of flowers altogether, and so compel them to "sport," and thus enable the horticulturist to obtain seeds liable to further sports and varieties, which might then be fixed in the usual way: thinking, moreover, that the succulent dahlia would be a good subject on which to experiment, I chose two,—a white one, with a very slight pencilling of red along the margin of each leaf, and one of an orange hue. These, after planting their roots, I surrounded with rings of charcoal and awaited the result, which is exactly what I had anticipated. The orange has become a vivid red, and the white has exhibited a singular variety of sports: flowers ranging from a splendid and complete red without a vestige of white, through mixtures of red streaked with white, and of white streaked with red, to some like the original white, have appeared simultaneously on one and the same stem. These results I spoke of to some of the working gardeners at the Zoological Gardens, where there is an immense display of dahlias: they had never produced anything of the kind, but I hope the hint will not be lost on them. The practical conclusion, however, which I would desire to draw from the facts is, that if flowers, and hence their seeds, can be thus or otherwise compelled to "sport," so may the seeds of the cereals and of green crops, such as turnips, potatoes, &c. and thus new, and it may be greatly developed, varieties be permanently obtained. I perceive that it has been lately observed that charcoal has a singular power of invigorating and changing or deepening the green colour of the leaves of the potato plant, and I cannot doubt of its having a like influence on its flower and seed. Our present ears of wheat may, for all that we know, be thus or otherwise developable even to the magnitude of Indian corn; which, I find, by the way, grows hopefully in Old Brompton, into a noble plant at least eight feet high, and yields heads as large as any I have ever seen of foreign growth. Even though it were not possible to ripen this corn thoroughly on the large scale and in average seasons in this country, we know that the Americans prefer it for many purposes in a green state, when it has a delicious milky juice which they turn to great advantage in various shapes on the dinner and supper table. What, then, hinders our horticulturists from rearing it in the meantime as a green crop at least? Were varieties that have been cultivated either in the higher or more elevated or in the more northern districts of America tried, they would doubtless speedily become acclimated, and yield abundant and most profitable farm crops in England.

Even apart, I may add, from any artificial means such as those I have indicated of developing and improving the grains of the cereals or indeed of any plant or vegetable whatever, were industry and perseverance displayed by our agriculturists year after year in choosing the finest seeds or grains of the finest plants; and from the plants yielded by these again selecting only the largest and finest, reiterating this process carefully year after year; I believe that wonderful developments would be the result—developments of which we have as yet little conception.

*Our moist Climate and its Evils: the influence of Drainage on it.*—Most fervently is it to be hoped that you are right in your expectation (expressed on 3rd April last) that the drainage movement throughout the country, agricultural no less than urban and suburban, will be promoted by the information collected by the Central Board of Health, and of which, at that time, you gave a comprehensive abstract. As then truly remarked—

"By drainage the climate will be ameliorated, *and many diseases prevented*. It has long been admitted that he who makes two blades of corn grow where only one grew before is a benefactor to his species. Thorough drainage does more than this. It tends to lengthen life as well as increase the means of living."

The association between that curse of our country, its moist climate, and the prevalence of consumption, and of colds, the fruitful seeds of consumption, is but too well known. Would that anything like a remedy, or even a preventive, were only half as well known. Like epilepsy and hydrophobia, this, as you observe as to the former, "is an opprobrium to the medical profession: they cannot reach it." As to a remedy, however, I have good reason to believe that the faculty are likely now to have it in their power to remove this opprobrium so far as regards various forms of consumption. And it is an interesting circumstance that the hopeful means should emanate from the ultimate source whence so much mischief originates in the dampness of our sea-girt isle—the ocean itself: I allude of course to the use of certain oils obtained from the fishy tribes. My present purpose, however, is to offer all whom it may concern a hint on the subject of prevention as well as cure. Nothing is more difficult often than to cure even a cold: sometimes it is no less difficult to prevent one; and even the most careful are often surprised to find all their prudence and precaution—whether defensive or offensive—whether simply protective or by braving its advent and hardening the constitution against it—to be of no avail. A recent announcement in the *Lancet*, to the effect that rheumatism and inflammatory ailments of various kinds, including even hemorrhage from the lungs, have been cured in a singularly brief space of time by the simple and palatable agency of lemon juice, emboldens me to mention, that lemon juice having been used occasionally for many years by one of the members of my family subject to a scorbutic ailment, and with various collateral benefits of a remarkable, and, at first, of an unlooked-for kind, I am prepared by this and other experience of its benefits, to state that those who dwell either in damp districts or damp houses, and are hence subject to rheumatism, coughs, colds, &c. will find the free use of lemon-juice, where it otherwise does not disagree with them, a most effectual preventive as well as remedy. I have found the regular use of a wine-glassful or two a day so strengthen a very delicate constitution, liable to colds on the slightest occasions, that it in a short time defied not only damp, but every inclemency and all exposure, and, with the subsequent aid of cod liver oil, advised by several physicians, if not, indeed, also partly by means of the lemon-juice, which was simultaneously continued, an individual who was on the brink of the grave has been restored to health and strength.

So far as regards the influence of lemon-juice, it seems reasonable, even *à priori*, to think that if, as declared in the *Lancet*, it speedily cures inflammatory disorders, it OUGHT *both to cure and to prevent the access of colds*, which are diseases themselves of an inflammatory order.

In the simultaneous or alternate use of two such agents as the vegetable acid and the animal oil in question, there is a much more natural adaptability to the composition of the organism and the blood than there is in strictly medical drugs, amongst which, indeed, these can scarcely be classed at all; and if diseases of so dangerous and obstinate a nature as consumptions, colds, &c. as well as rheumatism and other ills, can be overcome by them or by one or other of them, it is assuredly better to resort to such simple and comparatively, or rather positively, harmless agencies than to the nauseous and horrid contents of the "medicine chest."

J. E. D.

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ALLEGED STATUE OF THE DUKE OF BRIDGEWATER.—In consequence of a statement in the newspapers that Lord Ellesmere intended to erect in Manchester a statue of the Duke of Bridgewater, at a cost of 10,000*l*. his lordship has publicly contradicted the rumour.

## THE ARCHITECTURAL MUSEUM, CANON-ROW, WESTMINSTER.

Having long ago urged the importance of forming a national Museum of Architecture, we can but be glad to hear of the steps which are being taken by the committee appointed some time ago with that end in view. Every one who has been practically engaged in architecture must have felt the need of a collection of casts from the best ancient works of ornamental sculpture, statues, and other objects not capable of being readily or sufficiently represented by drawings. Even if an architect can spare time for frequently travelling from one monument of ancient art to another, which none of us can do to such an extent as we ought, he still needs, when at home, the aid of casts to recal the richer portions of the details to his memory, and he needs them to be arranged in such a manner as to enable him to compare the corresponding features of the different works he has visited. This necessity is also greatly increased by the fact, that the majority of objects which an architect has ordinarily before his eyes, are calculated to corrupt his taste and to deaden his feelings, so that good taste and warmth of feeling in art, are only to be obtained by some stimulant constantly at hand, to compensate for and correct the effect of these adverse agents.

It is quite true that *nature* is the true refuge from the chilling effects of bad and degenerate art; but she has been so long neglected, that we want the example of better times to show us how to use her. At Cologne cathedral, for instance, they compose their ornamental foliage by joint reference to casts from ancient carving and casts from natural leaves: the manner in which they thus learn to use natural objects with such conventionalities as are necessary to adapt them to their situations and to the material made use of, is instructive.

If, however, such a collection as that which we advocate is necessary to *architects*, who have frequent opportunities of visiting original works, how much more is it necessary to the workman who has no such opportunity, and is nevertheless expected to produce works in the same spirit as those which he has rarely, if ever, seen, and who is held up to ridicule if his works fall short in merit of those of artists of the best times.

It is by familiarising their eyes and their minds to fine works that real improvement in the taste of our carvers and decorators may be expected. A workman cannot, however, afford the loss of time and wages, much less the actual outlay, requisite to visiting ancient works, unless close at hand; and employers will very rarely aid him in doing so. Even if this were always practicable, we should still consider the Museum of Casts a necessary adjunct, for the same reasons which we have for its being so to an *architect*. The work, *in its place*, will undoubtedly inspire the noblest sentiment, and will show the propriety of ornament to its position, but the collection of casts is after all the object for constant reference and study, the continual reminder of what has been seen *in situ*, but cannot be visited again. It would be our wish to add to such a Museum, a large collection of casts from natural foliage; nature containing the first principles upon which, though not rejecting necessary conventionalism, we must ever be falling back.

The great difficulty to be met in the formation of such a Museum by individuals arises from the costliness of premises necessary for the object, particularly if in a central position. The committee *have, however, resolved to make a beginning*, though humble, and have taken two or three rooms in Canon-row, approached from Parliament-street. The rooms are of a very rough description, but they have this recommendation, that they will hold a great many casts, and are capable of periodical extension, as the income and collection increase. What they now want is to secure widely extended support, both by annual subscriptions and by donations of casts. When they have funds sufficient, they will endeavour to obtain casts from abroad.

Among the works already contributed are by Mr. G. G. Scott, a fine collection from Ely and the Chapter House, Westminster; Mr. Scoles's casts from Athens and Rome, taken under his inspection while there, the whole of these belonging to the Ecclesiological Society; some fine casts moulded under the superintendence of Mr C. R. Cockerell, R.A.; a noble Greek head from the Louvre, others from Canterbury, by Mr. W. Burgis; from St. Mary's, Reading, by Mr. A. Billing; from Windsor, by Mr. S. Cundy; some panels by Mr. J. L. Pearson, from Wells, &c. by Mr. B. Ferrey; also from Mr. S. Clarke; some fine ironwork from Mr. P. C. Hardwick; the Messrs. Hakewell, Richardson, White, Nash, have been contributors: some have also been secured from the Cottingham collection; and Mr. J. Ruskin has kindly promised some noble specimens of Venitian art taken under his personal inspection.

On the amount of annual subscriptions and donations of casts, depends the whole success of the project, and we wish to enlist our readers in its behalf. By the small endeavours of many, such a collection may be made in the course of a few years as will supply a want under which architecture in this country has long laboured.

## THE PAINTED WINDOWS, ST. GUDULE'S, BRUSSELS.

### PRINCIPLES OF GLASS PAINTING.

May I beg the favour of a place in the columns of your excellent journal for the following remarks, chiefly descriptive—on the painted windows in St. Gudule's, Brussels, which were the subject of a difference of opinion some weeks ago, between one of your correspondents and myself in the pages of The Builder? I may add that I have just visited them in returning from Germany, and that the remarks I send you were made on the spot.

The four windows in the side of the Chapel of the Miraculous Sacrament (which were those alluded to) date from 1540, and contain each two groups. The lower range consists of portraits of kings of Portugal and Hungary, Francis I. and an Emperor Ferdinand, with their queens, in kneeling attitudes, attended by their patron saints. The upper range are subjects of divers character; the groups are placed under open porches, or in colonnaded covered galleries, recalling a little some of the more decorative pictures of Veronese and Tintorette, or the allegorical pageants of Rubens. A fair and accessible illustration of the architectural treatment may be got from the monuments of Edward VI. Elizabeth, and Mary of Scotland, in Henry VII.'s Chapel, Westminster. Place one above another, filling the space between the pinnacles of the lower, and the base of the upper with panelling, and substituting the groups for the tombs and effigies, and you will have the arrangement, architectural and pictorial, of the windows in the Chapel of the Miraculous Sacrament at Brussels. The surfaces, however, are much enriched with figures and other decorations, and abundant, if not elaborate, detail.

The open ground within the architecture is filled in with considerable masses of pale blue of a lilac tone. There is no vestige of anything like a back-ground, so called,—neither tree, nor building, nor distant object—all flat pale blue. This ground has, I believe, been recently restored, as they say, in exact imitation of the old—that it is nearly like it there is no reason to doubt; but the old would be more broken in tint, for this is indeed *flat* to excess. The groups occupy something less than a third of the whole, exclusive of the tracery. The tracery and points of the openings above the canopies are filled in with white quarry-work, with some heraldry and spots of coloured decoration. The whole effect of the windows is bright and light, which goes far to redeem a very exceptionable character of design. The only part that can be said to have any power of shadow is the ceilings of the canopies, and there it is light in tint, but the extent and flatness make it noticeable as shadow. They are relieved a little by coloured festoons, pendants, and open ornaments. For the rest, shading is nowhere remarkable. The whole of the four, are as light, and even lighter, than late Perpendicular windows are generally, and, as compared with windows of their own date, I should say they are light to exception: white and yellow form at least three-fourths of the entire surface; and so little is contrast of colour a feature of them, that blue, only a tint or two deeper than the ground, is much used, and in large pieces against it; then cool purples, some warm light purples, some light greens, and ruby in small quantities. The ruby, where it is used, looks harsh, partly from its being rather dark in tint, but chiefly because the other colours are harmonized to a cool tone, and the red contrasts unpleasantly.

The drawing is very good, both of the figures and architecture,—I should say especially of the latter; the action of the figures and the expression good, too; the style of painting free, yet careful; the faces and hands are on white glass, slightly tinted. The third window from the transept is the best; the group of Francis I. and his Queen, with St. Francis D'Assise and St. Catherine behind, and the group above it, are conceived and executed in a good style: the figures are simply arranged, and on a single plane, unless a figure kneeling, in front of another standing, can be called foreground and background.

And now, I would leave the whole in the hands of yourself and your readers, and would ask whether (the windows being such as I have described them, and the greatest favour any one could do me in this matter would be to examine them with this description in his hand,) I was not justified in saying, that these windows were incorrectly quoted in support of a system of glass painting whose characteristics were stated to be *complicated foreground groups, receding landscape backgrounds, and the strongest contrasts of colour and of light and shade!*

All is light and glassy, with the exception of the shaded ceilings which I have noticed, though even there the glass is not lost: still, the shaded roof and the careful perspective give an appearance of positive recess, which I should fancy the most partial would allow to be highly injurious to the building at least; the effect being to lead the eye outside and at right angles from the altar in a narrow chapel, with the windows on one side only: this surely, to any sensitive eye, cannot but be most distracting, and would have been avoided had the work been kept within those rules of low relief which are alone suitable to glass in its relation to architecture.

I could wish no more instructive lecture to a glass painter, whose judgment had been tolerably grounded by study of the fine works of the fourteenth and fifteenth centuries, than can be read in the windows of the choir of St. Gudule's. Let him begin at the north transept corner, and examine the windows I have described; then let him face about and look at the corresponding ones in the Lady Chapel opposite, those huge architectural monstrosities, and he will have seen the germ and the tree—the first introduction of false taste, and the rank magnitude of its full-blown excrescence. Those in the chapel of the Miraculous Sacrament have a silvery brilliance and sweetness of effect which, in spite of the preponderance of the architectural accompaniment, stamps them genuine and fine windows; but the recessed roofs and elaborate perspective show clearly the rock on which the opposite artist has split, who, in the Lady Chapel, goes off amain, thrusts up enormous piles of opaque building and columns that make the cathedral itself look fragile and slight: despising balance, he aims at being striking and picturesque, sends off receding terraces and mighty ascending steps, settles his groups into corners, with huge rolling masses of shadow measurable by square yards. Here, indeed, force of shadow has been tried with astounding success—there is scarcely a piece of clear glass or of pot-metal colour in all the four; but those who can admire such things in glass must be left to themselves, for it is impossible in looking at them to command patience enough to be critical.

These are said to have been designed by a pupil of Rubens, and have internal evidence sufficient to prove them of his school, but they are so entirely bad as glass, that I would not have mentioned them here were it not to

illustrate the fact of the evil effect to be feared even at the hands of clever artists, when the principle and purposes of an art are forgotten; and as in glass, the beauty of the material despised, and the composition and effect made an outrage to the architecture that affords them a position.

A practical commentary is to be found in the modern glass: in the window over the altar in the Sacrament chapel, the artist has attempted to give additional relief to his subject by darkening the background with deep shadow; then, having perceived his error, he attempts with better success to avoid it in the small chapel behind the high altar, and has kept the windows more equable and light: but still, improved as these are, the student will observe how far deficient in breadth and brilliancy they remain as compared with those in the chapel of the Miraculous Sacrament; and taking all together, old and new, back to the test of his previous study, he will feel himself in a favourable position to judge how far relief by shadow is admissible in painted windows, and at what point it becomes vicious.

In conclusion, I would simply observe, that the windows in the chapel of the Miraculous Sacrament at Brussels are worthy of a visit from every student of glass-painting, being fine in themselves, and a point in the history of the art, but that they might prove dangerous and delusive as models, were it not for the warning supplied by the extravagant errors in the opposite chapel of the Virgin.

F. W. O.

## THE WORKING MASONS OF EDINBURGH.

THE condition of the working classes in our chief towns has of late begun to assume that prominence in the public estimation which is due to it as one of the most momentous and important questions of the age. In order that the way may be paved towards the future elevation and welfare of these classes, a close and searching investigation into their present state and their past history is not only desirable but necessary; and the public are deeply indebted to those who carry out such investigations in a right and impartial spirit. The *Edinburgh News* has begun a series of articles on this subject, with an interesting account of the working masons, as the most prominent members of the building trades who have made Edinburgh what it is, in material and in structure, as a stone-hewn city. The author of this article takes a rapid glance through the ancient and less modern history of the trade, and then proceeds to give some account of the "building mania," as it was called, whereby the New Town of Edinburgh rose into existence. This took place between 1820 and 1826. Previously, or rather in the beginning of the century, the number of masons in Edinburgh was nearly equal to that of the present year. The wages were 18s. per week in summer, and 12s. per week in winter. In 1815 a period of unusual depression reigned throughout the trade. In that year there were only one or two houses building in the whole of Edinburgh and Leith: there were also not above seventy masons in the town. This, however, did not last. The time was fast approaching which involved the most interesting as well as the most painful period in the history of the trade. The conclusion of the war, and the subsequent improvement in commerce, began at length to exercise their good effects on Edinburgh.

"Speculative building began in 1820. In 1823–4 the mania had reached its height. Streets, squares, places, crescents, sprang into existence with unparalleled rapidity. The ground-rent exacted in some cases was monstrous. Population (or, in plain terms, people to live in the houses) was never thought of. In two years masons' wages rose from 18s. to 28s. per week. Workmen from every conceivable quarter of the country poured into Edinburgh. Old masons, who in 1815 had taken to keep provision-shops, and in other ways to eke out a subsistence, once more resumed the 'mell.' Apprentices of two years' standing have been known to receive 20s. per week. It was computed that upwards of 3,000 masons were at this time fully employed in Edinburgh. Towards the autumn of 1825 the first symptoms of a general break-up began to appear."

Into the minutiæ of this catastrophe we need not here enter: a working mason who had been employed throughout the "mania" thus speaks of the whole affair, so far as regarded the interests of the men:—

"My wages were never less than 26s. more frequently 28s. sometimes 30s. per week. When the crash came in 1826, it was a serious thing for us: 2,000 men were thrown idle in a few months. There were hardly a job to be got; and at the end of 1827 there were not 100 masons left in the town. I have worked for 12s. per week in winter—less the broken time, which generally reduced it to 8s.—and 14s. a week in summer, for a number of years. Many good hands were worse off. The system of tasking or sub-contracting had been introduced by the masters, and was all but universally adopted. I have known excellent hewers, who worked sixteen hours on a long summer's day, and very often slept night after night in the shed beside their stone, receive 9s. for their week's wages. A statement of my own wages, which I carefully kept, gives for seven years an average of 11s. 3d. per week. At length, in 1841, the Masons' Union was established in Edinburgh. In three years we had accumulated an available fund of 4,000*l*. We then agreed to have a general strike throughout the trade. It began in 1845. We kept it up for seven weeks; but the strike was most extensive in Glasgow. The masters, instead of listening to our grievances, although they were closely combined themselves, and met regularly with the view of adjusting the wages, petitioned Parliament to suppress our union as illegal. Some of our best hands were put in jail for conspiracy. Although the best-informed among us now disapprove entirely of strikes, yet we still think our first and greatest combination was right, because our demands were just. We at length effected our object. We abolished sub-contracting: we obtained 18s. per week in summer, and 14s. per week in winter. We have often since had partial turns-out, but only one more general strike, and that was in 1847. This was the time of the railway mania, and our wages had for the last two years stood at 26s. The masters published a decree reducing them to 21s.: we resisted this for three weeks, but compromised for 22s. 6d. There was not more work, however, and the wages soon fell to 20s. per week, or 4d. an hour, at which rate they still continue."

A master mason of the time being gives a very different view of the question, however. He declares that—

"There never existed a worse class of men than the masons of that period. They were dissipated: they were idle; they were insubordinate. * * * They have been known to drive to the shed in a hackney coach, put down their tools, and hurry away to drink. They systematically corrupted the apprentices, who were taught the same habits without cost. Four days a week was a good average of their work. They maintained among them a parcel of good-for-nothing fellows who did no work, who were furious drinkers and furious spouters, and who were the everlasting cause of sedition and mischief."

Times are totally changed now, however, both with men and masters.

"The old '26 men—now, alas, few and far between,—speak of their masters with respect. They say the Edinburgh builders of the present day are a credit to society. Very often they possess the power of lowering the wages, but they never use it. A better understanding now exists. Let us hope that this improvement in the trade will for ever render impossible the occurrence of such another period of suffering and misfortune."

There are upwards of 800 masons in Edinburgh and Leith at the present time.

"Fully two-thirds of that number are hewers. Almost all the hewers are bred in Edinburgh; almost all the builders are bred in the country. In the whole number there are not more than 100 apprentices. The period of apprenticeship is five years: the wages begin with 3s. and 4s. per week. Masons supply their own tools: a full 'kit' costs from 2*l*. to 2*l*. 10s. and the masters pay for sharpening them. Each mason has his private mark on his tools; and it is curious to what expedients they are sometimes driven for a novel design. A peculiarity, for the origin of which we must look to the masonic superstitions of the middle ages, belongs to the trade, in their mode of notifying the hours of beginning and leaving off work. In place of ringing a bell or blowing a steam-whistle, the functionary who keeps time retires to the back of the shed and creates the singular repetition of sounds popularly known outside as the 'mason's chap.' It is a tradition in the trade that a mason with his mell in the air will let it descend without striking the chisel when he hears the first sound of the signal. The wages at present are 20s. per week; but, making allowance for broken time in winter, and other causes of loss, we doubt if a mason's wages will average 16s. the whole year."

The statistics of "the masons' trouble,"—phthisis from dust in the lungs,—constitutes a painful topic in the history of the mason craft:—

"Dr. Alison has said that 'there is hardly an instance of a mason regularly employed in hewing stones in Edinburgh living free from phthisical symptoms to the age of fifty.' We can go lower than that—we can state from pretty extensive observation, that there are none but suffer from it at forty. We do not, in truth, know ten hewers (working) in Edinburgh above fifty, and only two above sixty. It is to be observed, however, that the celebrated Craigleith stone, of which the New Town of Edinburgh was built, contributed more largely to this characteristic disease than the softer stones at present in use. An old Craigleith man was done at thirty, and died at thirty-five. Our information is filled with melancholy reminiscences of the ravages of this disease. Out of twenty-seven apprentices—fine, young, healthy men—who began with Forsyth at the erection of Cramondbridge twenty-six years ago, only two survive. Out of 120 hewers who worked at the High School in '27, we know of only ten survivors. In a squad of thirty stout hewers who began the Edinburgh and Glasgow Bank twelve years ago, only the one-half lived to see it finished. *The stone-cutting and carving of the Scott Monument killed twenty-three of the finest men in Edinburgh.*"

By way of prevention, it is recommended to work the stone damp, and to ventilate the work-sheds. Dr. Alison, too, recommends the Edinburgh hewers seriously to wear moustaches and beards, which are said to have been found in practice abroad to act as respirators. Why not use proper respirators themselves? It is useless, however, to urge what we fear few or none will adopt.

It is gratifying to find that the Edinburgh masons are now nearly as noted for temperance as they once were for its reverse. They are also otherwise improved.

"We have met them—by the way you can always distinguish a 'dorbie' at a glance—with a newspaper or a book, sometimes with a plant or a flower to adorn the window-sill of their bed-room. As to the general intelligence of the trade, that is indisputable. They are moderate in their political opinions; they entertain sound views on political economy generally; and, above all, they are profoundly sensible of the duties which they owe to society and to each other."

## NOTES IN THE PROVINCES.

*Lincoln.*—The gas company here have just declared a dividend of ten per cent.

*Rickmansworth.*—Gas works for this town have been begun and completed in three months. On Thursday before last the opening of the works was attended with festivities, illuminations, fireworks, oratory, &c. Mr. T. Atkins, C.E. of Oxford, was the contractor for the works. On Friday, the workmen in the employ of Mr. Atkins were regaled with a dinner. The mains are now being extended to Batchworth.

*Reading.*—Parochial schools for Mr. S. Lawrence, of Reading, are in course of erection here to accommodate 300 children, seated at desks, as directed by the Committee of Council on Education. The site of the schools is within the precincts of the ancient monastery of Reading. The style of the school buildings, which is Early English, and the material flint and stone, is intended to harmonise with the interesting remains of the abbey which still exist. The contract is taken by Messrs. Biggs and Wheeler, at 916*l*. The architect is Mr. John Billing.

*Uttoxeter.*—The small new church of St. Michael, at Stramshall, near Uttoxeter, was consecrated on Thursday week. It is situated on a knoll of ground at the upper end of the hamlet, and has been erected by Mr. Evans, of Ellastone, from designs by Mr. Thomas Fradgley, of Uttoxeter. It is a stone structure, in the Pointed style of architecture, with buttresses, a wooden porch, and a small bell

tower. Its internal appointments are simple. There is a five-light window in the west end. The building contains seats for about 200 worshippers, and is surrounded by a churchyard of about three-quarters of an acre in extent. The entire cost of the building was 1,275*l*. The site was given by the Rev. J. Ward, of Wath, Yorkshire, besides a subscription to the building fund.

*Milton and Culham.*—The two almost contiguous churches of Milton and Culham have been undergoing restoration during the summer. The latter, indeed, with the exception of chancel and tower, has been entirely rebuilt through the instrumentality of the vicar (the Rev. Robert Walker) and the parishioners, and is already roofed in, and will be fit for use in the course of next month. The miserable and dilapidated chancel, it was expected that the lessee of the great tithes would have rebuilt. The new arch of the chancel rises up above the roof of the chancel itself. It is hoped, however, that this anomaly will soon be remedied. At Milton, Mr. Bowles, a chief resident proprietor, following the example of Archdeacon Clerke, the rector, who last year built an entirely new chancel at his own cost, and threw the old chancel into the nave —has just rebuilt the north aisle of the same church. This has been made under direction of Mr. Street, the architect of the diocese.

*Pershore.*—The project for the lighting of this town with gas has been abandoned for the present, from the difficulty of obtaining a suitable site for the works.

*Evesham.*—Great improvements, according to the *Worcester Chronicle*, have been made in this quiet little town during the last two years. Among these is the new bridge across the Avon.

*Bridgnorth.*—A public meeting has been held for the purpose of considering the best means of improving the drainage of this town. It is *feared* that the Health of Towns Act will be put in force. On all sides it is granted that something must be done to improve the sanitary condition of the town. The necessity of paying for the necessary improvements, seemingly, is the real source of uneasiness and fear.

*Ammerdown.*—A column, commemorative of the late Mr. T. S. Jolliffe, is in process of construction on one of the highest points in the uplands of Ammerdown-park, in Somersetshire. The entire structure, with its base, pedestal, and capital, it is calculated, may reach an elevation of 150 feet, and will command from the summit an extensive panorama, comprehending the valley of the Bristol Channel, with the mountains of Wales in the distance, and the undulations of the Wiltshire downs with some of the most prominent objects in the adjacent counties.

*Wells.*—The restoration of St. Cuthbert's Church is progressing. The chancel roof, and the east window, are now completed; and a window, containing the symbols of the Last Supper, and of the Crucifixion, painted by some ladies of the family of Mr. R. C. Tudway, M.P. has been placed in the north chancel. The present churchwarden, Mr. W. Fry, has also undertaken a continuation of the improvements by the removal of whitewash and plaster disfiguring the columns and arches separating the nave from the north and south aisles. This portion of the restoration will be completed in a short time.

*Brecon.*—While the ratepayers of the parish of St. David's, Brecon, were discussing the question whether their old church required immediate restoration, or was likely to "stand other fifty years yet," the edifice itself decided the question by tumbling down into a total ruin on Saturday week. A resolution had actually been passed for the erection of a new one, a subscription accordingly opened, and a large sum subscribed, when the resolution was rescinded, on the ground that the old church had half-a-century's good service remaining in its tottering walls!

*Liverpool.*—On Tuesday in last week the foundation stone of a new asylum for orphan boys in Liverpool was laid by the mayor, and immediately afterwards the foundation stone of a new church, appropriated to the institution, was laid by the Bishop of Chester. The church is to be the free gift of Mr. Harmood Banner, president of the institution. Mr. John Cunningham is the architect, and Mr. A. Miller the builder.

*Southport.*—The commissioners of Southport have published the details of four months' working with bog-head cannel and water gas, by White's hydro-carbon process. The result, according to a Liverpool paper, shows a clear profit of twenty-four per cent. after paying for all materials, labour, and interest on capital. The gas is charged 6s. 8d. per 1,000 feet. The consumption in the period embraced in the return is said to be under 3,000 feet per day, although 30,000 in winter. The cannel, it is remarked, was brought by railway from Scotland, at a charge of 16s. per ton for freight, whilst on this 3,000 feet per day, there is the same interest on capital, and about the same charge for labour that would be on the 30,000. The Scotch cannels, for this system, are said to be far superior to any English cannels.

*Blackburn.*—Preparations for the erection of the new Town-hall commenced on Thursday in last week, by excavating the earth for the foundation. The contractors, Messrs. Stones and Hackings, are erecting a fence wall to enclose the ground.

*Sheffield.*—The second half-yearly meeting of the New Gas Company has been held, from which it appears that the company's works have been let out to various contractors bound to finish them within a short time. Very unseemly proceedings have taken place in consequence of the new company's pipes being laid in the streets. The old company having failed, by a recent announcement that the price of their gas would be reduced to 3s. a thousand cubic feet by March next, to effect the purpose they had in view, in thus doing what they would not do for behoof of the public, namely to destroy the new company, employed about forty men to undo the work of the latter by filling up the pipe trenches as fast as they were opened, and this on the pretence of removing an obstruction in the highway to a cab in which one of their officers pretended to want to go through that part of the street which was trenched; thus incurring the imminent risk of breaking the peace and creating a riot, in which the mob were quite prepared to join. The new company's men, however, were very properly withdrawn (after a whole day spent good-humouredly with their fellows in pitching earth out and in from and to the trenches) until the decision of the magistrates, who were appealed to, should be given, after which they were allowed to proceed without disturbance, at least in the meantime. The works of the old company are said to be quite inadequate to yield the requisite supply to the town, even at their present price.

*Newcastle-upon-Tyne.*—An addition has been made to Neville-hall (late Westmoreland House), the College of Medicine in connection with Durham University. The addition consists of a complete set of new apartments, to be used for education alone, reserving for the collegiate and domestic purposes of the University the old mansion, which will afford quarters for a considerable number of students, each of whom will be provided with a separate apartment, besides having the use of common sitting and dining rooms, the whole adjoining the apartments of the principal. The additional building, according to the *Gateshead Observer*, which presents its readers with an engraving of it, comprises, on the ground-floor, a library; lecturers', students', and porter's rooms: and all the necessary offices; together with a suite of four laboratories; and, on the first floor, lecture, museum, examination, and other apartments, with an open timber roof, in which lights are introduced. The façade fronts the open ground at the east end of the central station, and has a length of 113 feet. Its appearance is plain. Simple means have been employed to produce an embodiment of the collegiate architecture of the Tudor period. Mr. Dobson was the architect. The works have been executed by Messrs. Wilson and Gibson. The site presents capabilities for enlargement of the building, and is in the centre of the town.

*Arbroath.*—The foundation-stone of a Scottish Episcopal Church was laid here on Tuesday in last week. The extreme length of the building over walls, according to the local *Guide*, will be 110 feet 9 inches, and width 52 feet. On the Tuesday evening the workmen employed at the erection of the church, to the number of nearly sixty, were entertained to supper in Bruce's Hotel—the expense being defrayed by the managers of the church. Mr. Henderson is the architect, and Messrs. Brand are the contractors; Mr. Anderson, the "inspector," or clerk of works, we presume.

*Nairn.*—A Secession Church has been erected to the west of the town of Nairn. It is proposed to have several cottages immediately commenced in the vicinity of the church, according to plans by Messrs. Mackenzie and Mathews, architects.

*Monikie.*—The foundation-stone of a free church was laid here by Lord Panmure on Friday week. The site was granted by Lord Panmure. The building is already considerably advanced. It is situated at the east end of the Dundee Water Company's supply pond, near the monument erected by the tenantry of the late Lord Panmure, and stands on a high elevation. It is to have a belfry, and the front looking towards the south. It will be seated to accommodate about 350, and is to be the Panmure family church when residing at Panmure House. The building is expected to be ready early in spring.

## NEW STATE HOUSE AT COLUMBUS, FOR OHIO, U.S.

We alluded some time since to the State-house in course of erection at Columbus. Annexed we now give a view and plan of the building, which is still in progress, from the designs of Mr. W. Russell West, architect.

The State House stands in the centre of an open square of ten acres, on a stone terrace 5 feet high. The floors of the porticoes are 5 feet above this terrace: from these, doors open into halls, 24 feet wide. In the centre, at the intersection of these halls, is a rotunda, 65 feet in diameter and 120 feet high. The rooms on the first floor are to be used as offices by the auditor, treasurer, and other officers of the state, and for the preservation of their records and papers. They are all vaulted with brick groined arches. On the second floor are halls for the Senate and House of Representatives, a library, court-room, and committee-rooms. The large rooms are lighted both from the sides and from the roof, but over the small rooms additional accommodation for committees is obtained on a third floor carried on iron joists.

The material of which it is constructed is a hard limestone, brought directly to the spot by railroad from quarries about three miles distant. Steam is also used on the building and at the quarry for hoisting, pumping, &c. The columns and pilasters in the Senate and House of Representatives are of white marble, Corinthian order; those in the halls are of dressed limestone: the jambs and moulded architraves of the doorways to the rotunda are also of limestone. The arches over these doorways are now finished. On the outside, some of the triglyphs are set. The roof will be entirely of iron and copper.

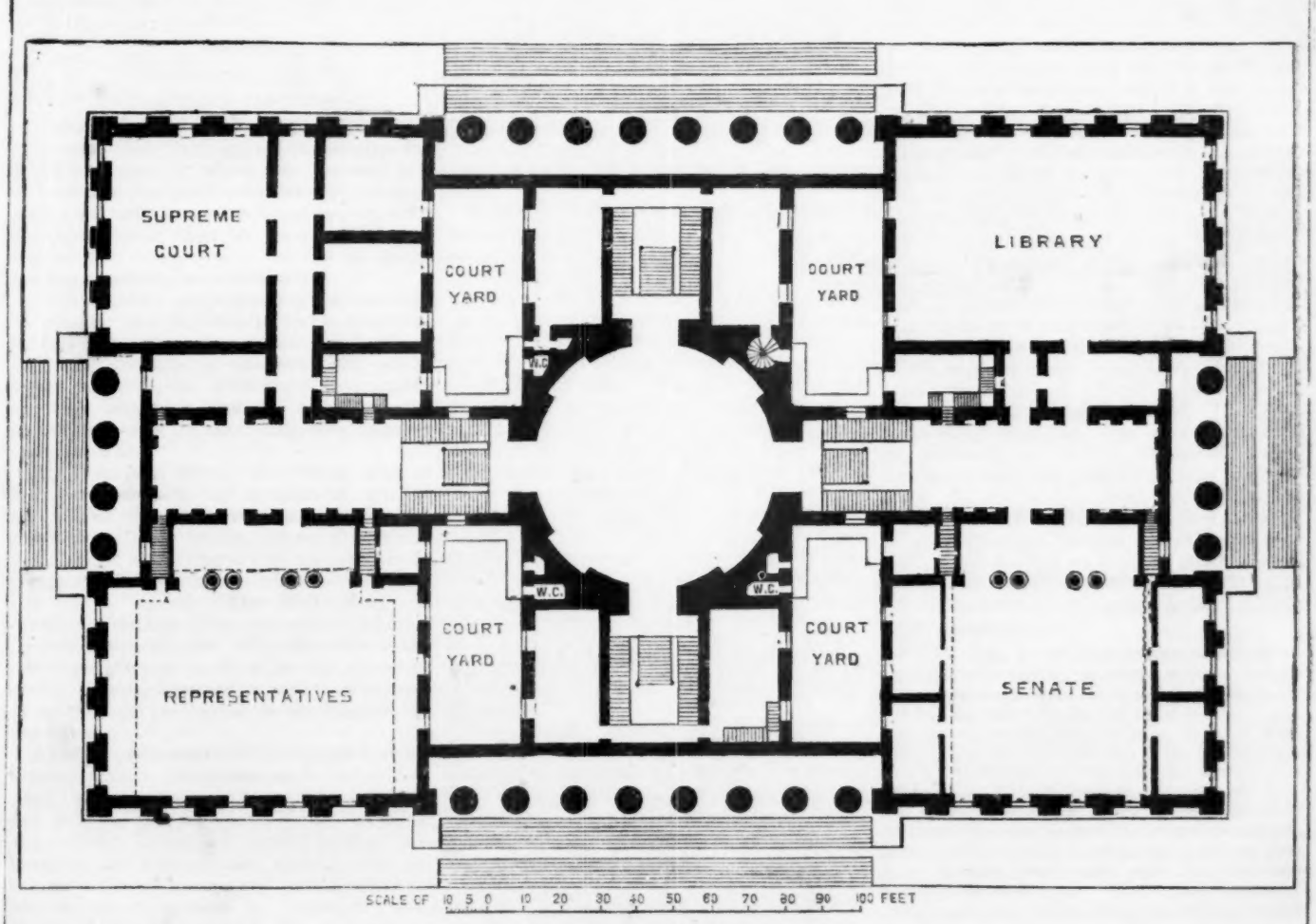
The order adopted, Greek Doric, was prescribed by the Government.

The following are some of the leading dimensions:—Length, 304 feet; breadth, 184 feet; terrace, 340 feet by 220 feet; columns, 6 feet 2 inches in diameter; Senate, 58 feet by 72 feet; House of Representatives, 72 feet by 84 feet; library, 56 feet by 84 feet; court-room, 43 feet by 56 feet: each of the four latter, 28 feet high.

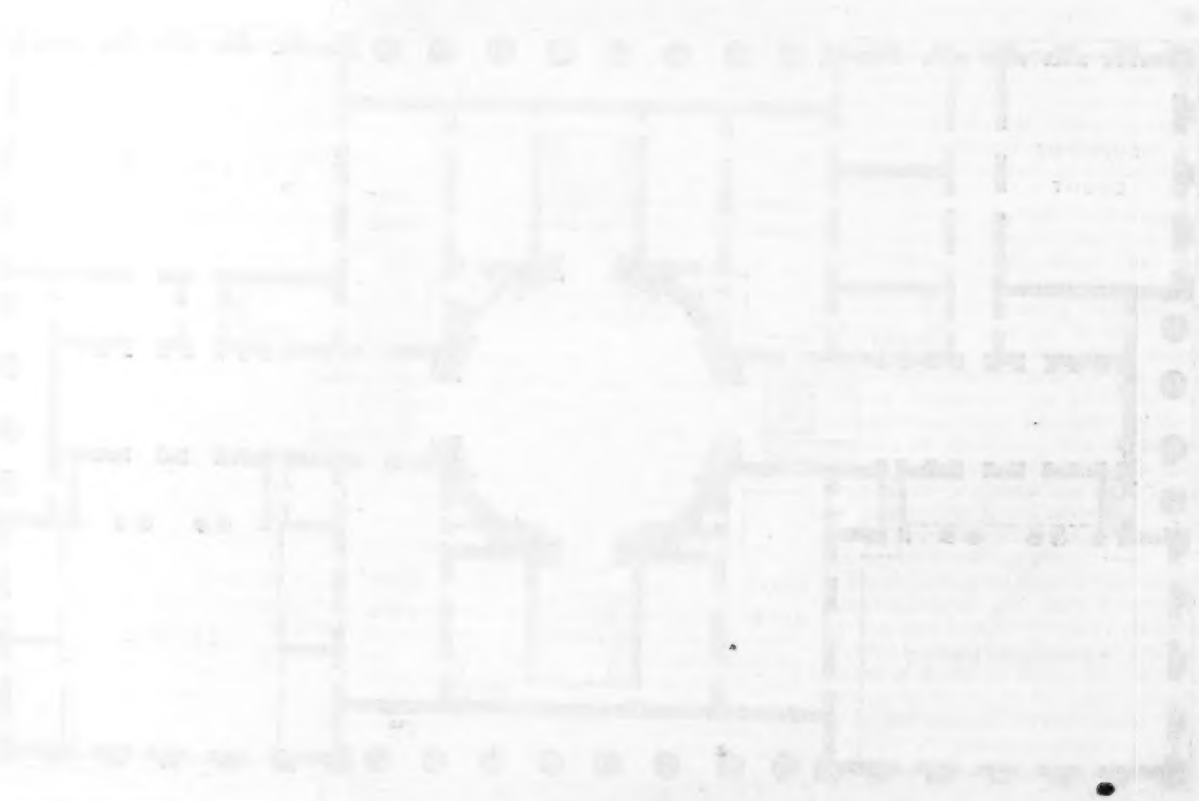
Northumberland House, Strand.—The court-yard, it is said, is about to be extended during the ensuing year. The houses on the west side of Northumberland-court are to be pulled down to admit of the extension.

At the Museum of Ornamental Art Marlborough House, during the month of September, 6,538 persons visited the collection on the public days, and 957 persons on the students' days.

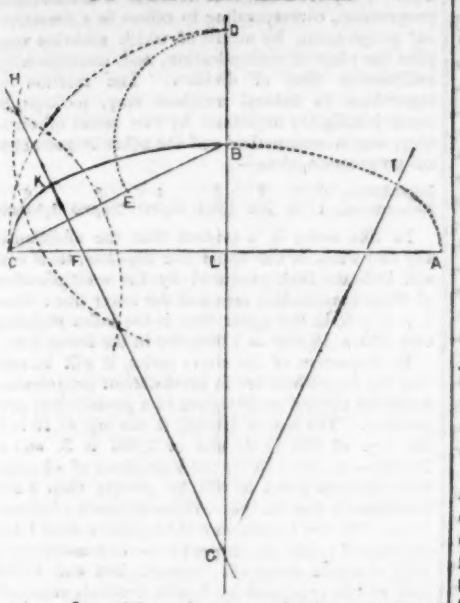
STATE CAPITOL, COLUMBUS, OHIO, U.S.——MR. W. RUSSELL WEST, ARCHITECT.




PLAN OF PRINCIPAL FLOOR.



## TO DRAW AN ELLIPSE.




As the ellipse is one of the principal problems, and a subject often uppermost amongst mechanics, especially masons and carpenters, I beg to offer the above for examination to the practical scientific readers of your valuable journal.

Let it be required to draw an elliptical curve through any three given points, ABC: with the radius LC, describe the quadrant CD, cutting the versed line in D: draw BC from the centre B, with the radius BD: describe the arc DE, cutting BC in E: bisect EC: draw GH at right angles to BC, cutting AC in P: from the point F, with the radius FC describe the arc CK, terminating in K: now from the point G, with the radius GK, describe the arc KBI, &c. cutting GD in B, which is one of the points mentioned.

It will be well to observe, that I do not give this problem as purely mathematical, but approximating the section of a cylinder as nearly as the double radii will allow.

FERDINAND PHILLIPS.

## THE SANITARY MOVEMENT.

THIS movement progresses, and will probably increase in intensity till the cholera has come and gone, by which time, however, it is to be hoped that much substantial and permanent good will have been done, as some little compensation at least for the evil which past neglect can scarcely now remedy by forthcoming measures, however active.

At Rochdale, a public meeting has been held to consider the propriety of applying to Parliament for powers to provide public baths, improved drainage, a cemetery, and public walks. Appropriate resolutions were passed by large majorities, and the local commissioners requested to take immediate steps to carry them out.

At Yarmouth, Mr. C. J. Palmer, who is ever occupied with one measure or another for behoof of his town, has written and published a letter to the mayor, urging the formation of a promenade and landing pier, to promote their health and general prosperity, and to be named "The Wellington," in memory of the late duke; the work to be done by public subscription. The side rails of the pier, he proposes to form in the shape of letters, running from end to end, so as to form an open-work inscription to the memory of the duke.

A public promenade for Stonehouse has also been proposed. The parishioners have authorised their Improvement Committee to negotiate with the manor authorities for the rental or use of the Battery-hill for that purpose as a healthful and cheerful site, whence, also, an extensive view of the bay and Sound would be had, as an inducement to recreation; the Board of Ordnance also to be requested to throw open the battery at the top of the hill.

At Windsor the people are astir for the establishment of a cemetery. The Woods and Forests, according to the *Windsor Express*, have offered to present the parish with a piece of low swampy ground on the Spital-road, which, however, the parish officers have refused. If they have an immediate prospect of something better, this refusal may be all right, but otherwise, might not the ground have been drained, or embankments made to keep out the water which is said to swamp it occasionally? The removal of a swamp is itself a good and useful work, and especially so as a preventive or a mitigant of cholera, so that thus a double good might have been at once effected by the formation of a burial-ground on such a spot. The inhabitants, however, want a cemetery disconnected with the parish, and for all religious denominations conjointly. The subject is felt to be a pressing one, in any view, and the *Express* remarks, that some arrangement must immediately be made for the discontinuance of interments, both in the parish churchyard and in the Acre burial-ground.

The subject of a public cemetery is also agitated at Doncaster, where a public meeting of parishioners was lately held, to take into consideration the best means of raising funds for carrying out a liberal proposition of the town council, in establishing a public cemetery for the dead of all denominations. The obstacles to the formation of a cemetery in Doncaster, however, it seems, are almost insuperable. A Government official is said by the local *Gazette* to have admitted the defective state of the law to be such that there is a necessity for immediate legislation, as there is no enactment to empower the rate-payers to tax themselves for the consummation of so laudable a design. A local Act would cost, in parliamentary expenses, little short of 2,042*l*. The Government, however, it is said, will have pressed upon them by the General Board, in the ensuing session, the adoption of a general measure for the establishment of provincial cemeteries. The corporation have obtained the sanction of the Treasury and the burgesses to appropriate seven acres and a half of land, which, according to Mr. Inspector Ranger's opinion, is well adapted in every respect; and the parishioners, to a man, are in favour of a public cemetery. It was determined that a committee should wait upon the corporation to finish the work; that is, enclose the ground by building a substantial wall, erect an appropriate chapel, build a suitable house for the person in charge of the ground, and prepare it for the reception of the dead. The *Gazette*, however, asks where the funds are to come from.

Sewerage, drainage, and water supply are of course amongst the subjects now on the tapis, as indeed they have been for some time past. At Chelmsford, on Friday week, a special meeting of the local board of health was held, for the purpose of taking into consideration a plan prepared by Mr. Fenton, the surveyor, for a complete system of drainage and water supply for the town. The plan proposes that the sewers be constructed with stoneware, socket-pipes, and carried under the river with iron culverts, and in all possible cases below the cellars of the houses. A system of filtering tanks also constitutes part of the plan of Sewerage. The total cost of sewers is estimated at 4,750*l*.; of tanks at 500*l*. For water supply, a reservoir of 80,000 gallons is proposed to be made on the site of Burgess-well, with another at the top of Wood-street, of same size, and an engine to fill the higher from the lower, with pipes from the former throughout the town. The cost of the whole is estimated at 4,845*l*. The plans are under discussion.

The question of sewerage is regarded at Sheffield, as one of so great urgency that it is proposed to authorise the Highway Board to carry out a general system of sewerage without incurring the delay and cost of an Act of Parliament, although the board, in strict legality, have no power to do so.

Preliminaries are being arranged at Darlington towards the immediate commencement of the drainage of the district east of the Skerne, a plan for which has been extra-officially examined and approved of by Mr. Austin, and was shortly to come before the Central Board of Health for their authorisation.

A process of cleansing and whitewashing of the filthy closes in the Canongate, Edinburgh, is in progress, under the authority of the sanitary committee in that city.

At Glasgow, a singular and salutary movement of a somewhat similar kind is taking place, and is thus described in the *Glasgow Gazette*:—

"Within these few days the residue of a former sanitary fund was placed in the hands of Captain Smart (of the City police). That gentleman caused bills to be posted in the worst localities of the city, offering premiums of five shillings each to the possessor of the cleanest house. There were from twenty to forty houses in each small district to which one prize was to be awarded, consequently the individual chance was small. These districts, many of them, for years and ages have been known as dens of squalor and hotbeds of disease and crime, consequently there was an inherent tendency to remain as they were. The day of inspection came round: Havannah, Vennel, Bridgegate, and Goosedubs were visited; close, lane, and tenement, penetrated and ascended,—and to the admiring astonishment of those engaged in this good work, the work of cleansing was found to be universal! Hardly a single exception! Here is a great fact lying at our very door. What can we make of it? The vile, the obdurate were moved. What moved them? Human sympathy. Why, if the money had been proportionally given it would not have been a penny to each house. The money was the symbol that they—even they—were cared for, and virtuous emulation fired their breasts, and gave vigour to their limbs. Surely this can, and will be, followed up. One hundred pounds a year, so distributed, would keep up a perpetual scrubbing and whitewashing."

## RAILWAY MATTERS.

ON Monday week, the earth on the south side of a cutting near the wooden bridge thrown across the South Yorkshire Railway in Warmsworth Field, tumbled into the cutting below, covering both pairs of rails. The slip extended at least thirty yards along the bank of the cutting, throwing down an immense quantity of materials.——The cost of tunnel-making, says the author of "Our Iron Roads," varies greatly. It is estimated that those formed for the old canals were less than 4*l*. per lineal yard; and that for railways of the ordinary dimensions, they vary from 20*l*. per yard in sandstone rock—which is easy to excavate, and does not require a lining of brick-work—up to 100*l*. and 160*l*. per yard in very loose ground, such as a quicksand, which may render it necessary to have brick-work lining of great thickness.——The formation of the Avignon railway, says the *Vivarais*, having necessitated the removal of the Mountain of Crussol, department of the Ardèche, a mine was formed, and, a few days ago, was charged with 50 quintals (about 5½ tons) of gunpowder. The explosion of this mass shook the earth for miles around, and a quantity of rock of about 25,000 square yards was blown down. It split into blocks of different sizes—most of them of 100 to 300 cubic yards. This great engineering operation was effected without any accident. —— It may be useful to note American views on English railway management. It will be seen from the following remarks in the *New York Times*, that the want of communication *between* the carriages in a train, a defect which we have for years insisted ought to be remedied, strikes an American as one of the most obvious and important defects in our management:—

"John Bull is certainly, in many respects, an amazingly slow coach. In whatever relates to railway management especially, it seems impossible for him to keep pace with the rest of the world. . . . . Last summer we happened to be in England, when a spark from the engine set one of the rear carriages of a railrord train on fire, and the inmates of it were soon placed in a very uncomfortable and perilous position. *There was no way of communicating with any other car, or with the conductor or engineer*, for the railway carriages are built now precisely as they were twenty years ago, *each one isolated from every other*. The car was burning at a very rapid rate, the fire being fanned by the speed of the train, and the passengers were beginning to compare the merits of death by fire, with death by leaping from cars running at forty miles an hour, when the state of the case was accidentally discovered by the engineer, and the train was stopped.

The whole English press was at once engaged in a discussion of the case . . . and to this day the discussion still goes on! Another stupidity of the same sort is perpetrated in England in the mode of collecting the tickets upon a railroad train. *As there is no way of passing through the cars*, they must be collected, of course, from the outside; but, instead of doing as the American conductors *used to do* under the *old system*, and as is now done upon the Austrian railways—passing along from door to door on the outside steps while the cars are in motion—the train is stopped a mile or two out of town, and there it stands till the tickets have been collected! *The idea of changing the shape of the cars, so as to allow a passage from one to another, and through the middle of each*, would probably shock John Bull as an innovation certain to prove fatal to the British constitution. The old style of carriages is religiously preserved. . . . . Part of the benches are cushioned; those are the first-class cars for the aristocracy. Others are of hard, plain boards, as comfortless as they can well be made, and these are for the common people! With all their boasted perfectibility the railways in England are not half as comfortable for travellers as those in the United States, and far less so than those of France. John Bull knows all this perfectly well, but he is so obstinately and doggedly conservative, so resolute in resisting change of every sort, that years will elapse before any essential improvements will be made."

——Mr. Derby, an American railway director of some celebrity, gives the following statement of the progress and returns of the railway system in the United States:—

"We number more than 13,000 miles of railway; have crossed the Alleghanies; and are pushing across the fertile fields and level prairies of the West. Since my letter of last year, we have added on an average ten miles per day to our lines, and I see nothing to prevent this rate of progress for five years to come, for our Western lines are constructed with rails of 60 lbs. per yard, and properly equipped for 3,000*l.* to 3,500*l.* per mile, and a traffic of 10*l.* per mile per week gives ten per cent. By the close of next year our great lines will strike the Mississippi, and a railway is already in progress from St. Louis to the verge of civilisation, 300 miles up the Missouri. Lines of telegraph and railway will soon move westward from this point to the Pacific. Our railways are generally successful. The lines of New England average over six per cent. Many of the New York Southern and Western lines pay seven to eight per cent. on bonds, and earn ten to twenty per cent. and besides this are annually gaining in receipts, while success with all seems to be merely a question of time. I think you may estimate that the whole railway investments of the United States will earn this year over seven per cent. on the aggregate capital. While the new lines are moving onward, the older enterprises have improved their tracks, equipages, and speed. Among the more prominent inventions of the day is a machine designed to bore tunnels, one of which is commencing a four mile tunnel in this state under the Hoosac Mountains, at a point where the elevation, 1,200 feet above the railway, render shafts impracticable. This machine has been used for smoothing large slabs of granite with success, and has an engine of sixty-horse power."

## WORKS IN CHICHESTER.

The north transept of Chichester Cathedral, which has been used for ages as the church of the extensive parish of the subdeanery, is about to be restored to the cathedral. A new church has recently been erected, in the West-street, for the use of the parishioners, from designs by Mr. R. C. Carpenter, in the style which prevailed in the middle part of the 14th century, and consists of a nave, chancel, north and south aisles. It is built of Caen stone, and the interior is finished, and fitted up with open oak seats of a character that accords with the building. There are sittings for 500 persons, and since it has been consecrated and opened for divine service, the church has been well filled. The foundation of the tower at the west end has been laid in, and this, with other external work, is shortly to be proceeded with. The windows are of the Flamboyant branch of the Decorated style, and that in the chancel, of five lights, surmounted with flowing tracery, has just been filled with stained glass, the work of Mr. Warrington, of London. The centre light, which is somewhat higher than the rest, contains the representation of the crucifixion of our Lord, and at the foot of the cross is Mary Magdalene, tenderly embracing it, and showing her sympathy by stanching the wounds of his bleeding feet. The opening on the right of this contains the figures of the beloved disciple, St. John, supporting the mother of our Lord, and in that on the left Joseph of Arimathea, with Mary, the wife of Cleophas, making up the group of symbolism of the chief subject of the centre. The subjects of the remaining two lights relate to the obituary character of the window; and illustrate the texts, "Joseph shall put his hand upon thine eyes," and "Knowest thou that the Lord will take away thy master from thy head to-day." These texts are introduced on scrolls at the foot of each subject, and beneath the centre one, "Behold thy son; behold thy mother." All these are surmounted by lofty canopies, which terminate in foliated finials, and these are continued by similar ornamentation throughout the tracery, so arranged as to form vesicas, in the principal one of which is the figure of our Lord ascending; in others are angels in Praise and Joy. At the foot of the window runs the following inscription:—"Memorial to Eleanor Braithwaite, aged 67, erected by her son George, Vicar and Subdean, Anno Domini 1852."

## Notices of Books.

*The Principles and Practice of Hydraulic Engineering applied to arterial and thorough Drainage, the Conveyance of Water, and Mill Power.* Second edition. By John Dwyer, C.E. Dublin, M'Glashan; London, Orr and Co. 1852.

Although, in some of the sections, Mr. Dwyer's book more particularly applies to Ireland, all who are concerned in hydraulic engineering, drainage, conveyance of water, earthwork, &c. will find it very valuable. The headings of some of the sections will show the nature of its contents:—On rivers; the quantity of water which annually falls in these countries; catchment basins; to determine the number of cubic feet any catchment basin will yield; proper form of channels, and the velocity of water in them; discharge of water through pipes and sluices; water as motive power; thorough drainage; tables of excavations and embankments. Many undertake works of the kind treated of here without any knowledge of the principles which should regulate them, and the result is, in many cases, disappointment and loss. It would surprise some of these worthies even to be told that the discharge of a 12 inch-pipe, with an inclination of 1 in 100, will be six times that of a 6-inch pipe with the same rate of inclination. Among the tables are some for finding the velocity and discharge per minute of rivers, canals, pipes, &c. calculated from the Chev. de Bûat's formula:—

$$\frac{307\sqrt{d-0{\cdot}1}}{\sqrt{s-\mathrm{L}\sqrt{s+1{\cdot}6}-0{\cdot}3\sqrt{d-0{\cdot}1}}} = \text{velocity per second}$$

The great difference in the quantity discharged by two pipes of the same diameter laid at different inclinations must never be overlooked. Thus, accordidg to these tables, a 4-inch pipe, which, laid with an inclination of 1 in 100, will discharge running half full 7.56 cubic feet per minute,—laid on an incline of 1 in 10, will discharge 30·8 cubic feet per minute.

One of his tables shows, and the result is important as respects the *shape* of conduits for the discharge of water, that while a conduit 4 feet 3 inches deep, with a bottom of 4 feet, will discharge 4,086 cubic feet per minute, a conduit 2 feet deep will require to have a bottom of 18 feet to discharge the same quantity.

Our author's explanation of logarithms is simple and clear:—

"Until lately, the use of logarithms was principally, if not exclusively, confined to the mathematician or astronomer: they are now, with great propriety and advantage, introduced into a variety of calculations, which has the effect of shortening the operations to a degree altogether incredible to those unacquainted with their properties or application. They are a series of numbers in *arithmetical* progression, corresponding to others in a *geometrical* progression, by means of which *addition* supplies the place of multiplication, and, consequently, *subtraction* that of division. The relation of logarithms to natural numbers may, perhaps, be more intelligibly explained by two series of numbers, one in arithmetical and the other in geometrical progression, thus—

| Logarithms, | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| Nat. numbs. | 1 | 10 | 100 | 1,000 | 10,000 | 100,000 | 1,000,000 |

In this series it is evident that the addition of any two terms of the upper line together, their sum will indicate that produced by the multiplication of the corresponding terms of the lower line: thus, 2 + 4 = 6, in the upper line, is the index standing over 100 × 10,000 = 1,000,000 in the lower line.

By inspection of the above series, it will be seen that the logarithms are in *arithmetical* progression, while the natural numbers are in a *geometrical* progression. The log. of 1 being 0, the log. of 10 is 1, the log. of 100 is 2, and of 1,000 is 3, and of 10,000 = 4, &c.; hence the logarithms of all numbers between 1 and 10 will be greater than 0 and less than 1; that is, they will be decimals: between 10 and 100 the logarithm will be greater than 1 and less than 2; that is, they will be expressed by 1, with decimals annexed: between 100 and 1,000, they will be expressed by 2, with decimals annexed: between 1,000 and 10,000, by 3, with decimals annexed, and so on."

Mr. Dwyer's book, it will be seen, merits the attention of our readers.

*Hand-book of Natural Philosophy and Astronomy.* By Dionysius Lardner, D.C.L. *Second Course.—Heat—Common Electricity—Magnetism—Voltaic Electricity.* Taylor, Walton, and Maberly, Paternoster-row.

It was originally intended to include astronomy and meteorology in the present volume of this sterling work; but, judiciously, we think, these subjects have been excluded, and are destined to form a separate volume to follow the present.

This is a strictly elementary work,—so much so that it would be found difficult to quote from it anything not exclusively adapted to that class of readers for whom it is designed, namely, those who desire to learn in a general way the present state of the various elementary branches of physical science, or who, having already done so, wish occasionally to refresh their memories on some one topic or other.

In general each subject is pretty well posted up to its most recent state of advancement, or at least to its latest established facts. On some points, however, we would have liked to have seen a little more of some of the more recent investigations, such as those on magnetism, and diamagnetism, including, by the way, some account of the magnetic, or magneto-electric telegraph, which ought to have been added to the chapter on the electro-magnetic and electro-chemical telegraphs. Of what the class of readers for whom the work is intended, however, most require, a substantial view of the general state of physical science, there is an abundant store, stripped of all mathematical and other details and difficulties.

*The New Patent Law; its History, Objects, and Provisions; the Protection of Inventions Act,—14 Vict. c. 8, and 15 Vict. c. 6; and the Patent Law Amendment Act,—15 & 16 Vict. c. 83.* By T. Webster, M.A. Barrister-at-Law. Elsworth, Chancery-lane.

In this pamphlet there is much useful matter in small compass and at a moderate price, the whole overlooked by one long versant, as Mr. Webster has been, with the subject. The new edition of his "Law and Practice of Patents," will be issued so soon as all the necessary forms, rules, regulations, and proceedings shall have been sanctioned. Those already decided on by the commissioners are here given. From what we hear, there seems to be some reason to fear that unless the stipulations of the new law in respect to what constitutes a separate and distinct patent be liberally interpreted by the commissioners, it is capable of giving countenance to much annoyance and unnecessary expense. If so, however, the ultimate thorough reform of the law will only be hastened by such grievances; but we have better hopes of it, even as it is.

*Book of Poetical Apothegms.* By Andrew Park. London: Bogue. 1852.

As Mr. Park originally contributed to our "Miscellanea" two or three of the apothegms which have grown into this little book, we owe it him to say, that it consists of 236 *quaternaries*, on all sorts of subjects, each complete in itself. Though the philosophy of many of these is erroneous, they form useful texts for thought, and are pervaded by a hearty, honest feeling.

Here are a couple of them:—

"Anger is partial madness, and the fit
Though but of short duration, yet may sit
Like a coiled serpent on the frenzied brain,
And urge to deeds we can't undo again."

"If all the epitaphs of fond regard
Are true, engraved in every lone churchyard,
How bad the living are—how good who die!
Alas! too many rest beneath a lie."

*The Cloud with the Silver Lining.* By the Author of "A Trap to Catch a Sunbeam." Wright, Pall-mall. 1852.

As we have thus been led into a little light reading, we will take the opportunity to mention a new story by the amiable author of many pleasant tales. All Miss Planché's stories are distinguished by high intention and kindly feeling, and "The Cloud with the Silver Lining" is not an exception. It may be read alike by the young and the old with pleasure and advantage. One of its wholesome inculcations may be given in a sentence:—"There may not be a Sidemoor near us" (the heroine and her husband are setting to work to reform a dissolute village of that name), "but there is work for us to do fitted to our powers, if we would but seek for it: it may be very humble, very slight to what others may be called on to do, but if we do it diligently our pay will be the same as theirs." The chief "moral" of the story is told by the title: and there are times when all may be cheered by remembering that the darkest cloud may have a silver lining. The writer of these little books is doing her own good work quietly and unostentatiously, and will, we hope, reap the reward she richly merits.

*A Series of Designs for Gothic Monuments, Churchyard Crosses, Slabs, &c.* By John Gibbs, Architect and Sculptor. London: Bell, 1852.

Twelve plates in lithography set forth a number of designs adapted from ancient examples of coped stones, crosses, and monuments, and more accordant with our mediæval churches than those which their walls for the most part exhibit. The majority of the monuments given are arranged to stand in recesses. The volume can scarcely, however, serve for more than a pattern-book for Mr. Gibbs's own employers: if intended for "those whose business or profession it may be," as he expresses it, "to perform the work of a monument," details at large are needed to make it useful.

## Miscellanea.

The Shaftesbury Literary Institute.—The *Dorset Chronicle* reports the first meeting of this new institution, which was held on Wednesday in last week, the Marquis of Westminster, president, in the chair, when the Rev. H. F. Yeatman, L.L.B. delivered to a crowded audience an interesting and able inaugural address on the progress of knowledge, from which we may quote the following passage on the architectural and other knowledge of the Egyptians:—"To give you some idea of what their powers of architecture were I would direct your attention for a moment to that wonderful city called Thebes, the capital of Thebais, or Upper Egypt, built by Osiris (who is said to be an Egyptian king, and the same as Menes, or Minæus, the first Egyptian king, and son of Ham), 2,020 years B.C. Osiris was worshipped as a god. Its extent was 420 stadii, or 52½ miles. Homer speaks of its having 100 gates, but it is doubtful whether these 100 gates mean the gates of the city or of its various temples. It was built on the east side of the Nile. Its great temple (according to Diodorus Siculus) was 1½ mile in circumference—45 cubits high, and its walls were 24 feet thick. That is a remarkable circumstance, tending to show the magnificence and grandeur of these temples. Besides this, there was the palace of Memnon, with its columns 40 feet high, and the walls covered with hieroglyphics. The sepulchres of the ancient kings were there to be seen; and these sepulchres contained paintings of the mysteries which the priests endeavoured to conceal. And it is remarkable that, in 1820, these pictures were considered to be perfect, and not much impaired by time. There was a temple at Jharnac, or Carnac, built by Sesostris, 1,500 years B.C. that is, 3,523 years ago. In the portico of one of these temples there were 100 columns, the smallest of which were 7½ feet, and the largest 12 feet in diameter—that is, 36 feet in circumference. If the portico alone contained 100 columns, such as these, I can only leave you to imagine what must have been the magnitude of that temple itself."

Great Quarry Blast in Argylshire.—At the Furness (or Furnace) Granite Quarry, on Lochfyne, near Inverary, a blast of three tons of gunpowder was successfully fired without the slightest accident on 29th ult. This quarry supplies granite causeway stones such as those with which the main thoroughfares of Glasgow are paved. The material is of the most hard and obdurate description. Several contractors for the blast tunnel gave up the job in despair; but a Welshman named John Rodger at length accomplished it. The work commenced in January last, and was only finished shortly before the blast took place. The quarry rises perpendicularly above the margin of Lochfyne to a height of about 80 feet, and presents a surface to the sea of 100 feet in length. Near the centre of this face, and 70 feet inward or back from the front, a vertical shaft was driven down through the granite mountain to a depth of 60 feet from the surface. It was 3 feet 6 inches square. From the bottom of this shaft two galleries or tunnels, of equal capacity with the main shaft, run each 17 feet in length, in a line, or parallel, with the quarry face. At the extremity of each of these little tunnels was placed a box containing a ton and a half of the strongest blasting power, or giving, in separate divisions, a total charge of three tons. The stemming or filling up of the galleries and shaft was effected by the formation of three inverted arches in each of the galleries, strongly built in with material properly dressed and closely cemented. Independently of these arches in the galleries, the space between, as well as the vertical shaft itself, was firmly packed with solid granite. The blast is said to have been of the most successful character. It is computed that 40,000 tons of granite have been torn up, varying in size from five tons downwards. Where the quarry formerly presented an even surface, there is now a gap 40 feet in width by 35 feet backwards, and the rent, it is believed, extends almost to the bottom of the quarry. The blast was fired by the galvanic spark from a battery only 60 feet from the mouth of the shaft.

Progress of Liverpool.—The dues on tonnage received during the past year have been 137,754*l.* 0s. 5d.; on foreign goods inwards, 86,402*l.* 3s. 5d.; and outwards, 22,530*l.* 1s. 10d. making a total amount of 246,686*l.* 5s. 8d. The interest on bonds amounts to 202,374*l.* 13s. 3d. leaving a margin for ordinary expenditure of 44,311*l.* 12s. 5d. The balance in the hands of the bankers and treasurer has increased from 103,148*l.* 15s. 11d. to 135,096*l.* 0s. 3d. The Albert Dock warehouses have produced for rates and rent 60,201*l.* 14s. 3d. the working expenditure being 36,258*l.* 6s. 6d. A table embodied with the accounts exhibits a remarkable history of progress. In 1752 the amount received for tonnage dues in Liverpool was 1,776*l.* 8s. 2d.; and in the closing year of the century, 1799, it was 14,049*l.* 15s. 1d. or nearly eight-fold. In the following year it leaped at once to 23,379*l.* 13s. 6d.; and in 1810 it had reached 65,782*l.* 1s. From this point it declined during the next three years, when it began again to increase, and has steadily progressed until we have in the past year an amount of 246,686*l.* 5s. 8d. although, in 1846, a reduction was made in the rates of 38½ per cent. and, in 1844, a reduction in the tonnage dues on East-India vessels of 33 per cent. or about 18 per cent. on the aggregate of foreign voyages; and again, in 1848, a further reduction, amounting to 40,000*l.* In 1800 the number of vessels frequenting the port was 4,746, and the tonnage 450,060 tons. In 1852 the number of vessels had reached 21,473, with a tonnage of 3,912,506 tons, or above eight-fold the tonnage of 1800.

The Gentleman's Room.—"Far beyond drawing-room or spare-room, and important above almost every other arrangement in your domestic establishment, is the consecration of one room to the especial use of the master of the house, *should his pursuits be such as to render occasional solitude and quiet needful or merely pleasurable to him.* A sound and a lovely policy is that which secures to a husband, in his own family, certain privileges and comforts that he can never find elsewhere, and that are calculated to counterbalance the weight of the many other attractions which his immediate circle cannot offer. A room to himself—a home within his home—*is* such a privilege, and few sacrifices are too great, if they may procure it for him: few advantages are great enough, if they must take it from him: it will keep him from clubs and card parties abroad, or from being 'always about' at home: it will prove a sanctuary from the numerous petty domestic troubles and annoyances that, as few men can comprehend or tolerate, it is much better that they should not see; or, should business or amusement induce a temporary absence, the image of his *own* room, and the gentle loving being presiding over its many indulgences and comforts, will follow him into 'hall and bower,' and, creating a salutary yearning in the midst of greater luxury and wealth, will guide him safely back again, where only he can rest in perfect happiness and safety."—*Home Truths for Home Peace.*

Assyrian Antiquities.—Further Discoveries.—Letters received in Paris from M. Place, consul at Mosul, report further excavations and successes among the mounds of Nineveh. Besides a large addition of statues, bas-reliefs in marble, pottery, and articles of jewellery, the French explorers have been able to examine the whole of the palace of Khorsabad and its dependencies. They are said to have obtained proof that the Assyrians were not ignorant of any of the resources of architecture. M. Place has discovered a large gate, 12 feet high, which appears to have been one of the entrances to the city; several constructions in marble; two rows of columns, apparently extending a considerable distance; and the cellar of the palace, still containing regular rows of wine jars. M. Place has caused excavations to be made in the hills of Bachieca, Karemless, Teu Leuben, Mattai, Karakock, Digan, &c. on the left bank of the Tigris, within ten leagues from Khorsabad. In them he has found monuments, tombs, jewellery, and some articles of gold and other metal, and in stone. At Dzisiran there is a monument which, it is supposed, may turn out to be as large as that of Khorsabad. At Mattai, and at a place called Barrain, M. Place has found bas-reliefs cut in solid rocks: they consist of a number of colossal figures and of a series of full-length portraits of the kings of Assyria. M. Place reports that he has taken copies of his discoveries by means of the photographic process.

New Application of Water Power.—Mr. T. Ainsworth, of Preston, is about to erect in Ribchester a mill for the manufacture of bobbins. The mill, according to the *Preston Chronicle*, will be worked by water power by means of a turbine, instead of a water-wheel. In this instance there is a fall of 60 feet. The water will be conveyed down a tube, 90 feet in length, at a considerable angle, and the continual flow and pressure of this column as it flows down the tube upon the turbine, makes it revolve. Thus the shaft is driven to work the mill.

The Elder Pugin.—In the remarks in your leader of the 25th ult. upon the loss which the profession has sustained by the death of Mr. A. Welby Pugin, you have alluded to his father as a Romanist. That he was instructed in the Roman Catholic faith in early life is not improbable, but having been resident with him for five years during my articleship, I can certainly bear witness that he did not attend the rites of that church. Though not a communicant of the Anglican Church, he occasionally attended her services and adopted her doctrines, and spoke unfavourably of the Church of Rome. If the elder Pugin lacked religious zeal, it was not wanting in his wife, who was one of the most enthusiastic followers of the late Mr. Irving, and a most determined opponent of Romanism under any form. Enthusiasm was the essence of A. Welby Pugin's nature, but it had no sympathy with his mother's tastes, and was soon engaged in other exciting objects which have been well described by Mr. T. Bury. Many other remarkable incidents in his eventful life might be added to that faithful sketch, but my simple purpose in these lines is to give my impression as to the elder Pugin's religion. I cannot, however, close these remarks without an expression of regret that so great a genius should be taken from us: he was great in everything he undertook, and his power of mastering any subject was truly surprising: being much associated with him in early years, and having accompanied him alone in many of his sketching excursions (when he assisted his father), I had good opportunities of observing the astonishing qualities which will place his name amongst those of the greatest men of this age.—Ben. Ferrey.

Principles of Decorative Art.—We perceive that a new feature has been introduced into the department of practical art, in Marlborough House, in the shape of large sheets, to be hung in various parts of the studio, containing the following excellent definitions of the principles of decorative art, as applied to metal works, pottery, and plastic forms generally:—"The form should be most carefully adapted to use; being studied for elegance and beauty of line as well as for capacity, strength, mobility," &c. "In ornamenting the construction, care should be taken to preserve the general form, and keep the decoration subservient to it, by low relief or otherwise: the ornament should be so arranged as to enhance by its lines the symmetry of the original form, and assist its constructive strength." "If arabesques, or figures in the round, are used, they should arise out of the ornamental and constructive forms, and not be merely applied." "All projecting parts should have careful consideration, to render them as little liable to injury as is consistent with their purpose." "It must ever be remembered that repose is required to give value to ornament, which in itself is secondary, and not principal."

Agricultural Machinery.—It is the duty of journalists to place before their readers whatever facts may conduce to the general welfare. We think we are fulfilling this duty in directing our readers' attention to a scheme propounded by Colonel Cartwright, at the recent agricultural dinner at Northampton. The colonel has devised a plan for a parochial district association for the purpose of procuring improved agricultural implements, and thus to save the expense of the large holder, and to place them within reach of the smallest. We believe the leading feature of the scheme is to provide for each parish or district a steam thrashing machine, a winnowing machine, a reaping machine, drills, and, if need be, a tile-making machine, draining plough, &c. &c. The mode of raising the requisite capital is to be by contribution from each shareholder, levied in proportion to the size of his farm. It is calculated that by this means, at an outlay scarcely greater than would be required *for one year's use* of these implements, every proprietor of this joint stock would have it in his power to avail himself of any machinery he might want. Some difficulties there would no doubt be. For instance, how is priority of use to be settled? It would often happen that the same machine would be wanted in several places at once. In times when farmers are told so emphatically (and even by those to whom they looked for relief), to "*trust to themselves*," every mode of cheapening labour must necessarily be adopted; and if Colonel Cartwright's cheap mode of cheapening labour is practicable, we think the sooner some steps are taken the better.—*Leicester Advertiser.*

Large Deposit of Graphite.—At St. John's, New Brunswick, near the new suspension-bridge over the St. John's River, a very extensive deposit of graphite has been opened. The vein or bed is nearly vertical, and inclosed between beds of highly metamorphic schists. The graphite bed has been explored by a gallery over 100 feet, and by cross-cuts at right angles to this some 20 or more feet. All these are in the graphite mass, and, of course, the floor and roof of the levels are of the same mineral. The graphite is not of very superior quality, though portions of it are pure. It has a foliated structure. Iron pyrites is abundantly diffused in it. The chief economical use made of it has been in facing the sand moulds for iron castings. Some of the finer parts are also used to manufacture pencils. Many hundred tons have already been taken out. The vein reappears on the opposite side of the St. John's River, and on the side now opened it has been traced over a mile. The position of the deposit, in conformable metamorphic schists, suggests the conjecture that it may represent a former coal bed.

The "Diggins Directory."—A curiosity in its way, with the Melbourne and Forest Creek, Victoria, postmarks on it, has been sent us direct from the Australian "diggins" (along with a snug little nest of "nuggets," like the golden goose's eggs, we *might* have had occasion to say, but as yet we *haven't*). "Bryce Ross's Diggins' Directory," printed by him at his "Agency," and "Herald's Office," on the diggins, consists of a single sheet, with an ornamental border, and contains references to the chief "stores" and "tent parties" at "Golden Gully," "Gully Flat," and other choice localities in the "Diggin" districts of "Forest Creek," "Fryer's Creek," "Bendigo," &c. &c. at Victoria. Besides miners' tents and general stores, the principal special stores named in this interesting memento of a semi-barbarous state of society, are eating-houses, butcheries, bakeries, and smithies. We are pleased to find amongst them, too, a "teetotal booth:" we hope it is always filled to overflowing. Surgeons seem to be the chief professional men amongst the miners: we observe no trace of lawyers *as yet*. "Wakefield, hairdresser," betokens something like a rising respect to appearances. There is an "Argus Office," no less than a "Herald's." The "Commissioner's Tent," is a grand centre and guide to collateral establishments in each district.

"The Canadian Journal."—We have from Toronto, under this name, a "Repertory of Industry, Science, and Art, and a Record of the Proceedings of the Canadian Institute,"* which promises to be well conducted. The Canadian Institute, when first proposed in 1849, was to be composed mainly of surveyors, engineers, and architects; but ultimately its professional character was changed to one of general description, and a royal charter of incorporation was obtained in November, 1851.

Meeting of the Norfolk Archæological Society.—The annual excursion of this Society took place on Thursday, in week before last. Buckenham, with its castle built by William de Albini; Harling, with its church and monuments; and Attleborough, of historic renown, offered many features, on which papers were read by members of the society. East Harling church was the first spot visited, and Mr. Harrod read a paper on various objects of interest in East Harling church. Mr. Manning also read a paper on a monument in the south aisle of the church. The company then proceeded to Banham church, and Buckenham castle, when a paper respecting the latter was read by Mr. Harrod. The church of New Buckenham, Besthorpe church, and Attleborough church were successively inspected, and a party of members then adjourned to the New Inn to dinner, where Sir T. B. Beevor occupied the chair.

* Published by Hugh Scobie, Toronto.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## TO CORRESPONDENTS.

"*To purify Sewage-water.*"—A correspondent wants to know the most simple method of purifying sewage-water, to render it clear and pure in taste.

"Curiosus," "Mr. B." (we are unable to comply), "F. T." (thanks for good opinion), "H. J.," "G. R." (we cannot take the responsibility of recommending investments), "C. L.," "G. L.," "C. C. N.," "J. L.," "F. W. O.," "W. P. G." (thanks), "Mr. Serjt. T." (thanks), "C. B. A.," "J. E.," "G. E. H.," "W. H.," "J. F.," "T. B.," "C. F. D.," "R. F." (yes), "Palladio," "Builder's Clerk," "S.," "G. O. L.," "A. W. M.," "C. L. M." (we cannot), "W. B.," "L.," "J. J. A.," "J. N.," "Mr. B.," "J. H.," "E. L. G.," "A. H. G." (no occasion for regret), "Warming Bath" (must depend on local arrangements: employ a competent person), "T. T." (shall appear), "Quondam" (ditto), "F. L."

"*Books and Addresses.*"—We have not time to point out books or find addresses.

NOTICE.—All communications respecting *advertisements* should be addressed to the "Publisher," and not to the "Editor:" all other communications should be addressed to the Editor, and *not* to the Publisher.


## ADVERTISEMENTS.

On the 24th of September, 1850, died suddenly, at New Orleans, ROBERT DUVAL, Civil Engineer, of London, in the 31st year of his age. This announcement has been thus long deferred from its certainty being unable to be obtained till the present time.

STEPHENS'S PATENT PROPELLING PENCILS.—A new kind of ever-pointed Pencil in Wood, lined throughout with lead, requiring no cutting, as the lead is propelled to the point by a novel, easy, and ingenious contrivance; is more economical than even the wood pencil, which is destroyed as used, whereas in these pencils the lead only is consumed, the pencil remaining as perfect as at first, ready to be refilled, and this is required only at long intervals. Prepared and sold by the Proprietor, HENRY STEPHENS, 34, Stamford-street, Blackfriars-road, London. Sold by Booksellers and Stationers; where also may be had his Writing Fluids, peculiarly adapted to Steel Pens.

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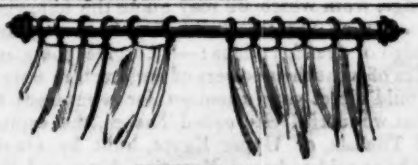

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**AN ARCHITECT and SURVEYOR**, in practice in the City, is desirous of receiving an ARTICLED PUPIL into his Office. With a Youth having a decided taste for the Profession, the premium would be made a secondary consideration.—Apply, by letter, only, to B. J. care of Messrs. Carter and Bromley, 23, Royal Exchange.

**BRICK-MAKING.—WANTED**, an experienced Person to undertake the entire MANAGEMENT of the necessary work in MAKING BRICKS, about eight miles west of London. Capital will be advanced, and all the bricks purchased at a stated price.—Reply by letter only to A. B. Office of "The Builder," giving a reference to where the party has been engaged in a similar manner.

**SURVEYOR and ENGINEER WANTED.**—The Local Board of Health of the borough of Macclesfield are prepared to receive applications from candidates for the office of Surveyor and Engineer. The salary will be 200l. a year, and candidates must possess a thorough practical knowledge of all the duties required by the Public Health Act; and in addition to those duties the officer elected will be required to superintend the Borough Water Works and the Corporate Property.—Applications and testimonials addressed to me, may be forwarded on or before the 27th day of October instant.—By order of the Board.

THOMAS PARROTT, Clerk.

Macclesfield, Oct. 7, 1853.

TO SURVEYORS.

**THE Corporation of Coventry**, as the Local Board of Health, having resolved to appoint a SURVEYOR of the COVENTRY DISTRICT, comprising a population of 35,000, who is to act as the General Surveyor of the Corporation, with a salary of 150l. a year; all persons desirous of the SITUATION, are requested to send applications, in writing, to me, with testimonials of their sufficiency, on or before MONDAY, the 18th day of OCTOBER instant, and will be expected to enter on the duties of the office immediately after the 9th of November next.

THOMAS BALL TROUGHTON, Town Clerk.

Coventry, October 7, 1853.

**WANTED**, by a CONTRACTOR of PUBLIC WORKS, who wishes to extend his business, an experienced PARTNER, with moderate capital.—Address, X. A. X. Office of "The Builder," 1, York-street, Covent Garden.

**WANTED**, immediately, TWO good TUCK POINTERS, to tuck-point twelve second-rate buildings.—Apply, by letter, to W. SMITH, Builder, Maldon, Essex.

**WANTED**, in an Iron Works, a TIME-KEEPER and GOODS-WEIGHER.—Apply by letter only, stating terms and particulars, addressed to G. B. 168, Drury-lane.

TO BUILDERS' FOREMEN.

**WANTED**, a competent FOREMAN, who has been accustomed to superintend the erection and finishing of first-rate dwelling-houses.—Apply, personally or by letter, to the Porter, at No. 23, Hanover-square.

**WANTED**, a steady active YOUNG MAN, of business habits, in a CONTRACTOR'S and SURVEYOR'S OFFICE. He must be a good accountant, and competent to measure work, and take out quantities.—Apply, stating references and salary required, to A. B. Post-office, Ruardle.

TO PARENTS AND GUARDIANS.

**WANTED immediately**, an OUT-DOOR ARTICLED PUPIL, by a Civil Engineer in permanent practice in one of the most fashionable parts in the west end of London. A premium expected.—Apply, by letter, F. 88, Office of "The Builder," 1, York-street, Covent-garden.

TO JOURNEYMEN SLATERS.

**WANTED immediately**, for constancy, a good WORKMAN. One would be preferred understanding the slab department; but he must have a thorough knowledge of the roofing.—Apply to JAS. BROWN, Slate Merchant, Chelmsford, Essex.—N.B. None need apply but steady characters.

**WANTED**, immediately, a CLERK of WORK, who has been accustomed to superintend Gothic building.—Apply by letter, stating salary, to A. B. at Mr. Dixon's, 40, Arlington-square, Islington.

TO BUILDERS' CLERKS.

**WANTED**, immediately, a CLERK, well acquainted with the general routine of a Builder's Office. He must also be capable of measuring work.—Apply by letter, to Mr. H. D. AUSTIN, 3, Cleveland-square, Paddington.

TO PRACTICAL ASSISTANTS, CLERKS OF WORKS, AND SURVEYORS.

**WANTED** immediately, a first-rate practical CLERK, by an architect in a large provincial town; he must be thoroughly acquainted with scientific construction, mechanical manipulation of iron, wood, and stone works, and superintending the execution of buildings; a good draughtsman, very rapid in getting out working and detail drawings, quantities, admeasurements, and calculations (this being an essential requisite), and extremely active and business-like, as he will be required to superintend the office. A knowledge of land-surveying is also desirable. None need apply who have not had from fifteen to twenty years' practical experience, and whose qualifications will not fully meet these requirements. Every letter to be accompanied with unexceptionable references or testimonials, and addressed VITRUVIUS, Office of "The Builder," 1, York-street, Covent-garden.

TO ARCHITECTS AND BUILDERS.

**WANTED**, by a Gentleman, a SITUATION in an Office of either the above. He has served his articles in a first-rate office, and is thoroughly conversant with architectural drawing and designing.—Direct to A. Z. Post-office, Belford, Northumberland.

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**WANTED**, by a Young Man, an ENGAGEMENT;—is a good Practical Draughtsman, and has superintended the erection of gas and water works. Most respectable references can be given.—Address to C. E. F. Post-office, Kennington-green, Kennington.

TO ARCHITECTS AND OTHERS.

**WANTED**, a SITUATION, as CLERK of WORKS, or FOREMAN to a BUILDER;—has had good experience in Gothic and other architectural works. Satisfactory reference can be given.—Address, T. Y. X. Office of "The Builder," 1, York-street, Covent-garden.

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|---|---|---|---|---|---|
| | | £ s. d. | £ | £ s. d. | £ s. d. |
| 5 | 30 | 45 19 2 | 1,000 | 94 13 0 | 1,094 13 0 |
| 4 | 40 | 33 19 2 | 1,000 | 65 0 0 | 1,065 0 0 |
| 3 | 30 | 24 15 0 | 1,000 | 43 14 5 | 1,043 14 5 |

GEORGE THOMSON, Manager.
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**THE PERMANENT WAY COMPANY** beg to call the attention of Boards of Directors, Engineers, and others interested in railways already made, to the important advantages obtained by fish-jointing the rails, as exhibited by the annexed extract from the Report of the Directors of the Eastern Counties Railway, to the half-yearly meeting of shareholders held on the 25th August. This invention not only saves a large current expense in keeping up the permanent way, but by its causing engines and carriages to run more smoothly, decreases the wear and tear of both the rails and rolling stock, and adds greatly to the comfort and security of the passengers. The Patent Fish-joints have been largely adopted by the Engineers of the following railways in this country and abroad:—

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Edinburgh and Glasgow,
Egyptian,
London, Brighton, and South Coast,
London and North-Western,
Midland,
Merseyshire,
North and South-Western Junction,
Waterford and Limerick,
York and North Midland,
York, Newcastle, and Berwick.

And are also in course of adoption on many other railways. For lines not yet furnished with rails, the company draw attention to W. H. Barlow's patent rail, as by its adoption the permanent way may be constructed at the lowest rate per mile, and with greater durability than by any other known system. These rails have been largely adopted by the engineers of the following:—

Great Western,
Dublin and Belfast Railway,
London and North Western,
Midland,
Midland Great Western (Ireland),
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South Wales,
West Cornwall, and
Hereford, Ross, and Gloucester.

The Patent Cast-iron Sleepers of Mr. P. W. Barlow are adapted to double-headed rails of any pattern, and supersede or replace wooden sleepers. They are adopted on the

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Midland,
East Lancashire,
Londonderry and Enniskillen,

and several other lines.

The Permanent Way Company confines itself entirely to the granting licences to use their various patents, which is done upon very moderate terms. Every information may be obtained by applying to Mr. CHARLES MAY, C.E. 3, Great George-street, Westminster; or to WILLIAM HOWDEN, Secretary, 26, Great George-street.

Extract from the report of the Directors of the Eastern Counties Railway to the half-yearly meeting of Shareholders held on the 25th of August:—

"The system of 'fish-jointing' has hitherto fully borne out Mr. Ashcroft's reports, as giving a smoother road, with less wear and tear to the rolling stock, and at a much reduced expenditure in maintenance."

Extract from the report presented to the half-yearly meeting of the West Cornwall Railway, held on the 28th August:—

"The result of the three months' working of the new rails between Penzance and Camborne has fully borne out the expectations which had been formed as to the durability of the description of rail which, under Mr. Brunel's advice, has been employed in the construction of that part of the line; and the attention of the board having been directed to the bad state of the permanent way on the old line, and the economy and efficiency of the working which would arise from relaying that portion with Barlow's rails, they have given orders for this to be done, and it is now nearly completed."

Extract from the Directors' report to the last Half-yearly Meeting of the Londonderry and Enniskillen Railway:—

"The trial afforded by six additional months' working has also confirmed your directors in the favourable opinion expressed by them respecting the cast-iron road of Mr. Peter W. Barlow."

It has fully answered the expectations formed of it, and there can now be no doubt that its adoption, coupled with the lessened wear and tear from the use of light engines, will effect a material saving in the maintenance of permanent way.

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6. Representative Reforms.
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8. Artillery and Ships of War—Sir H. Douglas and Colonel Chesney.
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London: LONGMAN and Co. Edinburgh: A. and C. BLACK.

**THE QUARTERLY REVIEW, No. CLXXXII.** is published THIS DAY.

CONTENTS:

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III. Irish Salmon.
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The "AERONOMIC REPORT," containing the above, with other equally interesting matter, published by A. VARNHAM, 41, Bedford-street, Strand, price 2s. 6d. to be had of most Booksellers, and at the "Aeronomic" Office, Upper Dorset-street, Bryanston-square.

*Literary Gazette*, 11th Sept. 1852.

"Architects, builders, and owners of houses ought to know the contents of this volume, which also contains matter interesting and amusing to the general reader. Some of the passages are not without historical value, as illustrating the domestic habits and even the public scenes of English life. For instance, we read of the ventilation of Old St. Stephen's in the time of Pitt and Fox and Sheridan."

*Bell's Life in London*, 3rd Oct. 1852.

"An important check on expenditure in all cases where a possibility may exist of measures being sanctioned and adopted, which, for lack of due attention to the laws of nature, and the exercise of common sense, are more than likely to prove in the end to be no better than mere wild theoretical or chimerical projects."

**PORTLAND CEMENT WORKS, NORTHFLEET, KENT.**—Messrs. ROBINS and CO. solicit the attention of their friends and the public to their superior Cement, confident that the great improvement in the manufacture thereof during the present year will insure to them a continuance of that patronage with which they have so long been favoured.—Orders received at the Works, and at Great Scotland-yard, Whitehall.

Great Scotland-yard, Whitehall.

**NOTICE.—PATENT PORTLAND CEMENT.** The CO-PARTNERSHIP lately subsisting between ROBINS, ASPDIN, and COX, having been DISSOLVED on the 7th day of November last, by a decree of his Honour the Vice-Chancellor Turner, and an injunction granted, restraining William Aspdin, then of Orme House, Northfleet, Kent, from intermeddling with, or receiving or disposing of any of the moneys, property, or assets of the said late partnership, and from using or pledging the name thereof for any purpose whatsoever, Messrs. ROBINS and COX, being alone authorised to wind up the affairs of the late Co-partnership, request the Creditors of the late Firm forthwith to render their accounts, that the same may be discharged; and the Debtors to the late firm will be pleased, at their convenience, to pay their accounts, either at the Cement Works, Northfleet, Kent, or at Great Scotland-yard, Whitehall, where Messrs. ROBINS and COX continue to carry on their Manufacture and Trade in Portland Cement, in connection with Messrs. Goodwin and Schmidt, under the style or firm of ROBINS and COMPANY.

**ATKINSON'S CEMENT,** so long known and esteemed in London, for plastering purposes, is a quick-setting Cement that requires no colouring.—Sold exclusively by JOHN BAZLEY WHITE and SONS, Millbank-street, Westminster; and Seel-street, Liverpool.

**KEENE'S and PARIAN CEMENTS and FRENCH PLASTER** for internal uses.—These well known hard stuccoes dry quickly, and can be painted upon within a few days. Made and sold by JOHN BAZLEY WHITE and SONS, Millbank-street, Westminster.

**PORTLAND CEMENT** is the cheapest, because the best Cement for external uses. As a stucco, it requires no colouring, does not vegetate, and is not affected by frost. As a mortar for brickwork, it may be mixed with three to four parts of sand; and, for concrete, it will carry ten to twelve times its volume of sand and gravel.—Manufactured by JOHN BAZLEY WHITE and SONS, 17, Millbank-street, Westminster, and Seel-street, Liverpool.

**PORTLAND CEMENT.—THOMAS FREEN** and CO. having completed their works at WOULDHAM-ON-THE-MEDWAY for the manufacture of PORTLAND CEMENT, beg to inform their friends and the public that they are now ready to supply them with cement of superior quality on reasonable terms.—Roman Cement and Plaster of Paris Works, Tuscany Wharf, Canal-road, Kingsland-road.

**PORTLAND CEMENT.—JAMES WESTON,** having commenced manufacturing the above Cement, begs to inform the trade in general that he can supply them with any quantity they may require, either at his Works, Mill-wall, Poplar; St. Andrew's Wharf, Earl-street, Blackfriars; or Middle Scotland-yard, Westminster. Manufacturer of Roman, Lias, and Mastic Cements, French and English Plaster, &c.

**PORTLAND CEMENT.—The difficulty of** procuring this valuable Cement of uniform colour and strength has hitherto prevented its more general use. Contractors and Builders will find that these two important qualities may be depended on with the greatest certainty in that manufactured by CHARLES J. HILTON, at his Roman and Portland Cement and Plaster of Paris Works, Faversham, Kent, at which place, as also at his Wharfs in London, 6, Upper Thames-street, City, and Great Scotland-yard, Westminster, orders can now be received to any extent.

**PATENT PORTLAND and ROMAN and ANSTON CEMENTS.—WINKFIELD, BELL, and CO.** of East Greenwich, Kent, having now completed some heavy contracts, are prepared to execute orders to any extent for the above Cements. Many highly respectable references can be given where their cements have been successfully used, both at home and abroad. Orders received and executed either from their works at Greenwich, or their wharfs, Lindsey Wharf, Chelsea; 24 Wharf, Harrow-road, Paddington; Phœnix Wharf, Whitefriars, City; Brine's Wharf, King's-cross; and Messrs. COLWILL Bros. and Co.'s, Bridge-st. Covent Garden, opposite the Office of "The Builder." —Agent at Southampton, Mr. GEORGE SHARP, Union Wharf.

6, South Wharf, Paddington.

**PORTLAND CEMENT.—CHARLES** RICHARDSON has the greatest confidence in introducing to the trade the above superior CEMENT, being of uniform colour and quality (a desideratum never before attained in Portland Cements). It possesses extraordinary cementitious qualities, resists the action of frost and heat, and is more durable than any other Cement; does not vegetate, turn green, or crack; combined with which its eminent hydraulic properties stamp it at once as the first cement of the day for work where all the above qualities are requisite. It is manufactured on the only principle Portland Cement can be, and contrary to the statements put forth by those who have hitherto had the monopoly. Manufactured by R. GREAVES, Esq. at his Works, near the River Avon, and sent to all parts of the kingdom per boat or rail, at a reduced price to the trade.

**PORTLAND CEMENT,** in Casks of Four Imperial bushels. QUANTITY, NOT WEIGHT, BEING THE STANDARD.—CHAS. FRANCIS and SONS, Cement Works, Nine Elms, London.

**MEDINA (ROMAN) CEMENT.—The** material of which this cement is made is obtained in the Isle of Wight. It has all the properties of the Sheppy Stone, but is much better adapted to engineering works, from the rapidity with which it sets and hardens under water. It has been long used at the great Breakwater at Cherbourg; in a similar work at Alderney; and at Dover New Pier, to unite the masonry. The foundation of the centre pier of the Tubular Bridge at Menai Straits is laid in Medina Cement. A new groyne at Sandown Bay, Isle of Wight, has been constructed of no other material but this cement and sea shingle. The work extends 200 feet into the sea, and is exposed to the most violent gales of the Channel, in a position where every former construction had been repeatedly washed away. The inconvenience of the varied qualities of Roman Cement are superseded by the use of this improved manufacture.

CHAS. FRANCIS and SONS, Nine Elms, London; or West Medina Mill, Newport, Isle of Wight.

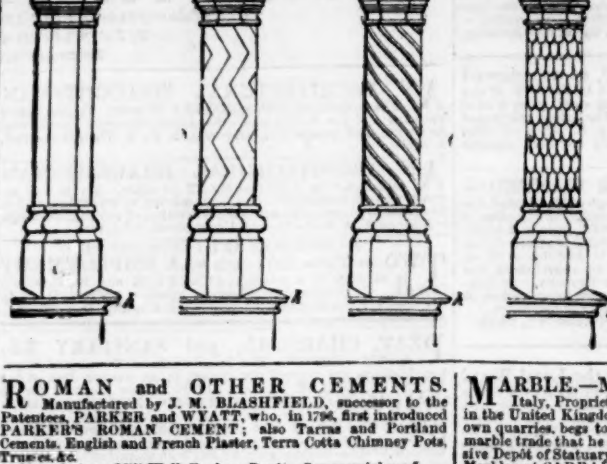
Agent for Southampton, R. L. FLUDER, American Wharf.

**PERMANENT STUCCO WASH,**
WITHOUT SIZE OR OTHER CORRUPTIBLE INGREDIENT.
As used at St. George's Hospital, Hyde Park Corner.

JOHNS and CO. having effected some important improvements in the manufacture of this very useful material, confidently offer it to the notice of the Trade and the Public generally, as possessing every advantage over the common Lime Wash or Water Colour for STUCCO or BRICK WORK. It is a Stone Colour, but may be tinted to any other.—DOES NOT WASH OFF—is perfectly dry in twenty-four hours, and, being a non-absorbent, is admirably adapted for Railway Stations, Union Workhouses, Barracks, Schools, Prisons, &c. One cwt. will cover 250 square yards. It will keep good for years, and MAY BE EXPORTED WITH PERFECT SAFETY.

JOHNS and CO.'S STUCCO CEMENT.—This cement, from the great reduction in price, and its suitableness for internal as well as external surfaces, places it above all other materials of its kind; it has no caustic qualities; may be painted or papered in a few days; never blisters, cracks, or vegetates; soon becomes as hard as stone; and may be cleaned with a brush and water.

The merits of the PAINT are well known for its application to stucco work of all kinds, and external work generally. Numerous testimonials, prospectuses, and every information may be obtained, on application to the Sole Agents, PHILIP HARE and Co, at the Warehouse, 22, Steel-yard, Upper Thames-street. A liberal allowance to wholesale dealers.



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Manufactory, Mill Wall, Poplar; Depôts, Commercial-road, Lambeth; and Paddington-basin.

**WILLIAM ASPDIN'S PATENT PORTLAND CEMENT.**—Messrs. ASPDIN, ORD, and CO. have much pleasure in informing consumers of this valuable Cement that as their works are now in operation they are prepared to execute any orders they may be favoured with.
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**PARIAN CEMENT** for internal use, to be PAINTED IN A FEW HOURS AND PAPERED WITHIN A COUPLE OF DAYS.—CHARLES FRANCIS and SONS, Patentees, Nine Elms, London.

TO ARCHITECTS, BUILDERS, &c.
**ALL descriptions of TERRA COTTA,** CEMENT, and PLASTER CASTINGS, executed in a first-rate manner, on reasonable terms, by J. HERBERT and SON, Modellers, &c. 42, Parker-street, Drury-lane. A splendid assortment of Corinthian, Ionic, and other Capitals; Centre Flowers, Balusters, Trusses, &c.; Elizabethan and other Chimney Shafts.

**TERRA COTTA.—Vases, Figures, Capitals,** Coats of Arms, Friezes, Consoles, Chimney Shafts, Flower Trays, &c. &c. manufactured by J. M. BLASHFIELD, Mill Wall, Isle of Dogs (near the West India Docks), and sold at No. 1, Praed-street, Edgware-road, Paddington.

**ASPHALTE.—GERVASE FOOTTIT,** Trinidad Asphalte Works, Rotherhithe; established 1834. Every description of Flooring laid with the above durable material in the best manner. Asphalte for Railway Arches, 40s. per ton. Importer of Trinidad Asphalte.

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**CORSHAM-DOWN, and other BATH and PAINSWICK STONE.**—MARTIN and WOOD beg to inform their Friends and the Building Trade generally, that all Orders and Inquiries for the above Stone will be promptly attended to by being addressed to MARKET-WHARF, REGENT'S-PARK-BASIN.

**CHEAP STONE.—Paving, 32s. 38s. and 42s. per** 100 feet; York sinks very low price, viz. 1s. 8d. per foot; sills, 7d. to 10d.; coping, 8½d. to 11½d. per foot. Chimney-pots, stone pipes, clay ditto, tiles, &c. at reduced prices. Country builders will find a decided advantage in making their purchases at this wharf, which is most conveniently situated for carriage by railway or canal. A priced list sent free on application to E. and W. STURGE, Bridge Wharf, City-road.—N.B. Cash prices on the wharf.

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**VALENTIA SLATE SLABS.—The Valentia** Slab Company invite attention to their Slabs now supplied, of very large dimensions and of superior quality. They have been used at the British Museum, National Gallery, Bethlem Hospital, various lunatic asylums, the Ordnance Works, Model Prison, Pentonville, and other penitentiaries, Malting Floors in Bedfordshire and Hertfordshire, Breweries, the Race Stand at Brighton, Portsmouth Barracks, and are kept in stock in large quantities at Freeman's Wharf, Millbank-street; also by Messrs. SHARPE, Tooley-street; and Messrs. BRABYS, Belvedere-road, where terms may be obtained.

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**MARBLES, THIRTY-SIX VARIETIES.**—Messrs. SANG, GOGEL and Co. have the honour to announce that they are enabled to execute, with unusual facilities, any works with which they may be favoured in the above beautiful materials, introduced into this country for the first time from their own Quarries, at a most moderate and hitherto unprecedented low cost. With these Marbles the most brilliant and artistic effects can be produced, and many of the veneers for the lining of walls in variegated colours can be supplied at scagliola prices. Estimates given for veneered walls, inlaid artists' work, coat of arms, monuments, ornaments, reproductions of sculpture, bases and columns, fountains, entablatures, floors (inlaid and plain), baths, tazzas, trusses, and skirtings.—Address to Messrs. SANG, GOGEL and Co. Marble Works, Eaton-lane South, Pimlico, London.

**Medieval Works, Memorials, Fonts, Screens, etc.**
AT A VERY ECONOMICAL RATE.
**SAMUEL CUNDY,** Mason and Builder, PIMLICO MARBLE and STONE WORKS, Belgrave Wharf, Lower Belgrave-place, Pimlico.
MARBLE CHIMNEY-PIECES manufactured by improved machinery. The public are invited to view the stock, unequalled for quality and price.
A GOOD MARBLE CHIMNEY-PIECE FOR FORTY SHILLINGS.
A liberal discount to the Trade.
MARBLE WORK in all its branches, at a remarkably cheap rate, for HALLS, DAIRIES, LARDERS, &c. &c.
Circulars sent on application.
N.B. The "Royal Blue" Omnibuses pass the Works every ten minutes from the Bank.

**WHITE BLUNHAM BRICKS and TILES.**—These Goods, so justly celebrated for retaining their colour without vegetating, and, combining great strength with a fine face, can now be obtained, in London, in various forms and sizes, and in any quantity. The Paving Tiles, Clinkers, Splays, Bullnoses, and Facings are well worth attention. Sole Agents: PHILIP HARE and CO. 22, Steel-yard Wharf, Upper Thames-street.

**BRICKS.—Malm Cutters, Yellow and Pale** Seconds, Paviors, and Pickings, of good and sound quality, constantly on sale at H. DODD'S Brickfields, which are only a quarter of an hour's walk from the City.—H. D. earnestly requests purchasers to favour him with a visit, in order to inspect his stock, and to judge for themselves.
Malm Place, half-washed Stocks, and Place Bricks, also on sale. These bricks are sound, well burnt, and unusually free from defects; a very large proportion of the stock being suitable for external facing.
Apply to HENRY DODD and CO. at the Counting-house, Hoxton Brickfields, Grange-walk, near the Rosemary Branch, Hoxton.
N.B. Red pit sand of approved quality constantly on sale upon reasonable terms. This sand, from its not containing any saline matter, is acknowledged to be preferable to river sand.

**PAN TILES, 48s.; Plain, 32s. 6d.; superior White** Suffolk Facing, Red ditto, Fire Brick, &c.—Best Stourbridge, Welsh, and Newcastle Fire Bricks, Lumps, Tiles, Clay, Windsor Loam, &c. Gas and other shaped Goods, Windsor and Nonsuch Oven Tiles and Bricks, Dutch and English Clinkers, Patent Malt-kiln and Corn-drying finely-perforated Tiles, 12 in. and 9 in. Paving ditto, unequalled in quality and colour, at WARD'S old-established Honduras Wharf, Bankside, Southwark, London. Thames Sand, Concrete, Gravel, &c. &c.

**PRIZE MEDAL AWARDED TO PEAKE'S**
TERRO-METALLIC TILES, PIPES, &c.
ILLUSTRATED TRADE LISTS, containing much information useful for reference; also unsolicited testimonials respecting a MATERIAL which, when well wrought, is probably superior to every other for drains or conduits, for ridges, hips, valleys, and every part of roofs, for plain or chequered floors, for paving and erections, of a strong and durable nature, also many other purposes, supplied genuine by THOMAS PEAKE (proprietor of Peake's "Terro-Metallic"). No. 4 WHARF, CITY-ROAD BASIN, LONDON, and at THE TILERIES, TUNSTALL, STAFFORDSHIRE. The lists contain both prices by number, and approximate cost by measure. It is solicited that letters be prepaid, and state if Staffordshire or London prices are wanted. Specimens were at the GREAT EXHIBITION, Class 27, No. 125 (having been at first No. 111).

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**ASHES and BREESE FOR SALE;** good quality, good measure, and in any quantity.—Apply to MARK I. TOMKINS, Green-bank, Old Gravel-lane, Wapping.

**GREAVES'S BLUE LIAS LIME.—The superior** manner in which the above is ground renders it cheaper for concrete or stucco than any other lime or cement. The shell lime for mortar is burnt on an improved principle, leaving scarcely any core. The satisfaction constantly expressed by Engineers, Architects, and Contractors, of the above, is its best recommendation.
Gibbs, Canning, and Co.'s Blue Vitrified Bricks, Pipes, Junctions, Bends, and Fire Goods.
ROMAN, PORTLAND, PARIAN, ANSTON, and LIAS Cements of the best quality.
SECONDS, PAVIORS', STOCKS, and other Bricks.
CHARLES RICHARDSON, 6, South Wharf, Paddington.

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